Emotional Influences on Practical Reasoning within Social Relationships; The Development of a New Deontic Selection Task

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

The process of constructing a new deontic selection task has been presented in this thesis. The key factors that influenced participant behaviour in previous versions of the selection tasks, such as plausibility, realism, familiarity, congruence between the conditional and context, goals, relevance to self, and negations, were identified and controlled within this new task. The new selection task provides an important new research vehicle that can be used to investigate practical reasoning and decision making in realistic decision contexts. This task has not been designed to study deductive reasoning; the reasons for this are set out in the opening chapter of this thesis. The construction of the task is presented across chapters two to five. Chapters six to nine then present research that was conducted with different versions of the new selection task, which investigated how emotions and other key aspects of the decision context, such as perspective, card array format, and rule-violation expectation, influence reasoning, decision making and choice within private social contract settings in which prudential agreements were made to manage social arrangements and relationships. The data obtained within these studies demonstrate that this research vehicle provides an important and useful means by which this kind of practical reasoning can be investigated and understood.

Significant effects were obtained in all studies conducted with the new task, and in these are patterns that can improve our understanding of how emotions and other aspects of the decision context direct information processing and behaviour. Implications of this work for current theoretical accounts are presented in this thesis, and recommendations for future research have been identified.

Table of Contents

Acknowledgements ii

Abstract..... iii

Table of Contents iv

Lists of Tables vii

Table of Figures x

Chapter One. The Old Selection Task, Accounts of Reasoning and Emotion 1

1.1. Defining Rationality in Choice and Decision-Making..... 1

1.2. Research with The Selection Task 5

1.3. Emotional Influences on Reasoning 16

1.4. Emotion: Information Processing and Representation..... 26

1.5. Current Research: An Exploratory, Descriptive Endeavour 33

1.6. Summary 34

Chapter Two. Key Factors That Influenced Card Selection: Previous Selection Task Studies 36

2.1. Development of the Construction Process. 36

2.2. The New Selection Task: Identification of Initial Key Variables 49

2.3. Summary 86

Chapter Three. Selection Task Structure and The Social Contract..... 87

3.1. Development of the First Draft Selection Tasks. 87

3.2. Basic Task Structure. 89

3.3. Social Contracts, Benefits and Costs. 91

3.4. Summary 107

Chapter 4. Development and Testing of Nine Selection Task Scenarios. 108

4.1. Construction of Selection Task Content..... 108

4.2. Happy Emotion-As-Content 115

4.3. Anxiety Emotion-As-Content.....123

4.4. A Neutral or Low Emotion-as-Content Condition?.....131

4.5. Assessment of The Selection Task Conditions.....136

4.6. Discussion.....147

4.7. Summary 155

Chapter Five. Development of Materials for The New Selection Task.....156

5.1. Introduction: The Creation of New Emotion-as-Content Tasks 156

5.2. Validation of Selection Task Materials.....179

5.3. Selection Task Materials for Study One: The Selection Process.....199

5.4. Adjustments to Selection Task Conditional-Contexts Post Selection.....201

5.5. Summary 202

Chapter Six: The First Selection Task Study 203

6.1. Introduction.....203

6.2. Method 210

6.3. Results.....220

6.4. Discussion.....237

6.5. Summary 250

Chapter Seven. The Second Selection Task 252

7.1. Introduction.....252

7.2. Method 259

7.3. Results.....262

7.4. Discussion.....266

7 5. Including Answer Veracity Directions within Selection Task Instructions. 270

7.6. Summary 271

Chapter Eight. The Fourth Selection Task 273

8.1. Introduction 273

8.2. Study Four: Rule Violation Expectation Instructions 275

8.3. The Fourth Selection Task 286

8.3.1. Method 287

8.3.2. Results 290

8.3.3. Discussion 298

8.4. Summary 301

Chapter Nine. The Fifth Selection Task Study 303

9.1. Introduction 303

9.2. Method 306

9.3. Results 310

9.4. Discussion 316

9.5. Summary 320

Chapter Ten. Closing Discussion 322

10.1. Two Key Goals. Task Construction and Emotion (plus factors) 322

10.2. Summary of Findings 325

10.3. Implications. 330

10.4. Limitations. 348

10.5. Future Work 349

References 354

Appendices 381

List of Tables

Table 1. Summary of the first variables used to guide development of opening scenarios, ground rules and card arrays for the new selection tasks. 50

Table 2. Examples of realistic, plausible, familiar rule content and contexts used in previous selection tasks. 53

Table 3. Examples of less convincing realistic, familiar rule content and contexts used within previous selection tasks. 54

Table 4. List items devised to structure and drive construction of the first selection tasks. 88

Table 5. Descriptive statistics for realism and familiarity by scenario and *emotion-as-content* condition (*N* = 12) 142

Table 6. Descriptive statistics for reported emotional response by *emotion-as-content* condition and scenario (*N* = 12). 144

Table 7. Additional comments: Effectiveness of stimuli to emotional responses... 146

Table 8. Additional variables that influence selection task behaviour: Identified during the development phase of the new selection task 160

Table 9. First variables identified as influences on selection task behaviour: Identified during the initial development phase of the new selection task..... 161

Table 10. Dining feeling labels by *emotion-as-content* condition 187

Table 11. Sledging feeling labels by *emotion-as-content* condition 188

Table 12. Lodge feeling labels by *emotion-as-content* condition 189

Table 13. Driving feeling labels by *emotion-as-content* condition 190

Table 14. Train journey feeling labels by *emotion-as-content* condition..... 191

Table 15. Leave Feeling labels by e*motion-as-content* condition..... 192

Table 16. Coursework feeling labels by *emotion-as-content* condition..... 193

Table 17. Travelling to catch a plane feeling labels by *emotion-as-content* condition. 194

Table 18. Travelling by boat feeling labels by *emotion-as-content* condition..... 195

Table 19. Significant differences in DES cluster difference scores by DES cluster and autobiographical recall emotion induction group..... 222

Table 20. Descriptive statistics for post-induction DES cluster scores by DES cluster and autobiographical recall emotion induction group 223

Table 21. Significant differences in post-induction DES cluster scores by DES cluster and autobiographical recall groups. 224

Table 22. Descriptive statistics for realism, frequency and outcome importance by emotion induction group and e*motion-as-content* condition 227

Table 23. Frequencies of kept and broke ratings by rule-violation instruction condition (*N* = 20). 280

Table 24. Frequencies of keep, no expectation and break ratings by rule-violation instruction condition (*N* = 20). 281

Table 25. Significant pairwise comparisons by rule-violation instruction condition (*N* = 20)..... 281

Table 26. Descriptive statistics for expectation intensity by rule-violation instruction condition (*N* = 20)..... 282

Table 27. Significant pairwise comparisons by rule-violation instruction condition for expectation intensity (*N* = 20) 283

Table 28. Significant pairwise comparisons by rule-violation instruction condition 291

Table 29. Descriptive statistics for falsification indices by *emotion-as-content* (*N* = 180) 294

Table 30. Mean falsification indices by *emotion-as-content* and rule-violation expectation instruction conditions (*N* = 180)..... 296

Table 31. Descriptive statistics for ‘other’ falsification indices by *emotion-as-content* 298

Table 32. Significant pairwise comparisons by rule-violation instruction condition 298

Table of Figures

Figure 1. Examples of initial sketches: Rule contexts and conditionals 92

Figure 2. Examples of initial sketches: Rule contexts and conditionals 93

Figure 3. Happiness scenario 1: Car loan and petrol exchange (a) 117

Figure 4. Happiness scenario 1: Car loan and petrol exchange (b). 118

Figure 5. Happiness scenario 2: Shared flat -- Room exchange (a)..... 119

Figure 6. Happiness scenario 2: Shared flat - Room exchange (b)..... 120

Figure 7. Happiness scenario 2: Shared flat - Room exchange (c). 121

Figure 8. Happiness scenario 3: Time off -Work shift exchange (a)..... 121

Figure 9. Happiness scenario 3: Time off - Work shift exchange (b)..... 122

Figure 10. Anxiogenic scenario 1: Working hours and module grades (a)..... 125

Figure 11. Anxiogenic scenario 1: Working hours and module grades (b)..... 126

Figure 12. Anxiogenic scenario 2: Exam results and a holiday (a) 127

Figure 13. Anxiogenic scenario One: Exam results and a holiday (b)..... 128

Figure 14. Anxiogenic scenario 3: Walking home with a friend (a) 129

Figure 15. Anxiogenic scenario 3: Walking home with a friend (b). 130

Figure 16. Neutral scenario 1: Turn taking with house chores (a)..... 133

Figure 17. Neutral scenario 1: Turn taking with house chores (b). 134

Figure 18. Neutral scenario 2: Milk loan and return 135

Figure 19. Neutral scenario 3: Shopping, unloading and putting away. 136

Figure 20. Notes from construction of the driving scenarios: Initial sketch and notes. 172

Figure 21. Notes from construction of the driving scenarios: Draft opening contexts in *emotion-as-content* conditions..... 173

Figure 22. Notes from construction of the driving scenarios: Draft opening contexts to conditional agreements. 174

Figure 23. Notes from construction of the driving scenarios: Anxiogenic opening context..... 175

Figure 24. Notes from construction of the driving scenario: Happy opening context 176

Figure 25. Notes from construction of the driving scenarios: Neutral opening contexts. 177

Figure 26. Notes from construction of the driving scenarios: Conditional agreement and card Array..... 178

Figure 27. Interaction between *emotion-as-within-person* and i*ntended-emotion-as-content* condition on mean confirmation indices (p = .007, partial/ η^2 = .08). 230

Figure 28. Interaction between *emotion-as-peripheral* and i*ntended-emotion-as-content* on mean falsification indices 234

Figure 29. Interaction between *group* and *intended-emotion-as-content* on confirmation indices (p = .024). 263

Figure 30. Interaction between *group* and intended *emotion-as-content* for confirmation indices (p = .027). 265

Figure 31. Mean confirmation indices by *self* and *other*, *emotion-as-content* and *rule-violation expectation* instruction condition 291

Figure 32. Mean falsification indices by *self* and *other, emotion-as-content* and *rule-violation expectation* instruction condition..... 295

Figure 33. Experimental conditions operationalized in the fifth selection task study 309

Figure 34. Mean confirmation indices by *emotion-as-content*, perspective (*self*, *other*), card array (*sample*, *population*), and agreement status (*joint*, *proxy-agent*) 310

Figure 35. Mean falsification indices by *emotion-as-content*, perspective (*self*, *other*), card array (*sample*, *population*), and agreement status (*joint*, *proxy-agent*) 313

Chapter One. The Old Selection Task, Accounts of Reasoning and Emotion

In this opening chapter, a brief outline of old normative accounts of decision-making and choice and the reasons for their rejection will be presented, as will a summary of the attempts to redefine rationality that accompanied this change. The role of the selection task in the development of new theoretical accounts of reasoning and decision-making will be outlined. The recent rejection of the selection task, and the reasons for this are considered in this chapter, and it has been argued here that this was a mistake; the reasons for this are set out below. A brief review of previous research into how emotions influence reasoning is then presented. This is followed by an account of how emotion is represented within current theoretical accounts of reasoning decision-making. It will be argued that these are hugely underspecified, and an argument has been made for why we need a better understanding of how emotion might influence reasoning and decision-making. The goals of the current research programme are then outlined, which seek to increase our understanding of how emotions might influence reasoning and decision-making, in the new selection task and in applied decision settings.

1.1. Defining Rationality in Choice and Decision-Making

The choice situation in which one is tasked with deciding how to act under conditions of uncertainty, has been the focus of much research interest (e.g., Oaksford & Chater, 1994; 1998; 2007; Evans, 1993; Evans & Over, 2013; von Neuman & Morgenstern, 1947). According to old normative decision theories, when faced with a number of choices or ways to act, each of which are each associated with one or more uncertain consequences, the rational decision maker selects the choice that will result in maximum expected utility (the maximization of benefit, and the minimization of cost), or if in competition with other rational decision makers, the choice that provides greatest security. Superficially, there might seem to be little wrong with these principles. However, the way in which

utility and security were calculated, the idea that we maximize utility, and the standards against which behaviours were judged in normative decision theories, gave rise to a great deal of debate. Within old, normative accounts of rational behaviour, access to complete information was assumed, as was the ability to allocate clear benefits and costs to different outcomes (e.g., Evans, 1993; Oaksford & Chater, 1993; 1998). They also assumed that rational preferences were fixed, that we should be able to acquire knowledge via logical proofs, use logic to establish truth, and construct arguments to support our choices using a normative intrinsic logic, in many different real world decision contexts (e.g., Evans, 1993; Oaksford & Chater, 1993; 1998).

Decisions in the real world, however, often take place in more complex contexts than were modelled within these old normative accounts. Within real world decision-making we lack access to complete information, and our ability to assess the likelihood of different outcomes is far from ideal; these kinds of arguments led to a move away from the old normative accounts of reasoning and decision-making, and old models of logic that could not account for real world information processing and behaviour. New theoretical accounts of human reasoning and decision-making were developed in response to, or as critiques of, the old normative models. Within these new accounts, researchers attempted to construct models of real world thinking and behaviour, that provided room for the influence of factors that seemed to influence thinking, decision-making, and choice – such as limited information processing capacity, knowledge, beliefs, goals, preferences, and uncertainty, all of which had been shown to influence participant behaviour in reasoning tasks (e.g., Evans, 1984; 1991; 1996; 2007; Manktelow & Over, 1990; Oaksford & Chater, 1993; 1994; 1998; 2007; Over & Manktelow, 1993). Data obtained from studies with the selection task played an important part in this move away from old normative, prescriptive models that presented unrealistic representations of real-world decision-making, thinking and behaviour. Research with the selection task also provided an important focus in the development of key theoretical accounts of human reasoning and decision-making: for example, in social contract theory (e.g., Cosmides 1989), pragmatic schemas (e.g., Cheng &

Holyoak, 1985), mental models (e.g., Johnson-Laird & Byrne, 1993), rational analysis (e.g., Oaksford and Chater, 1998; 2007) and the psychological theory of conditionals and hypothetical thought (Evans & Over, 2004). The selection task was thus an important research vehicle; data obtained from studies with this task led to a significant change in how human thinking and decision-making was modelled and assessed.

The rejection of the old models of rational behaviour, which failed to provide adequate representations of real-world behaviour, led to a difficult and lengthy debate about the question of whether human behaviour could be defined as being rational, and if it could, how rationality might be defined (see e.g., Elster, 2008; Evans, 1993; Evans & Over, 1996; Over, 2003; Gigerenzer, 1996; Greenspan, 2004; Nozick, 1993; Oaksford & Chater, 1998; 2007; Stein, 1996; 1997; Stanovich & West, 2000). This debate is not yet settled. Data that had been obtained from studies with the selection task played a central role in these debates. By some it was used to support arguments that human beings are irrational (e.g., Stein, 1996; 1997). The same data, and the analyses in which they were used as evidence of irrationality, were by others positioned as being evidence that the experimental psychologists who set the tasks had lost touch with the real world – the tasks that were being used to demonstrate irrationality, put participants in decision contexts that were not like the decision contexts in which they made real world decisions. These later arguments were made by defenders of the rationality of participant behaviour within tasks like the old selection tasks, and of real-world decision-making and choice.

Cohen (1981; 1982), for example, argued that participant behaviours that were interpreted as being due to 'errors' in reasoning, were seen as errors when they were judged against the old, inappropriately applied, normative standards. Participants within these tasks might be using other systems to determine choice. The psychological experiments that show people behaving irrationally, he argued, are unrepresentative of real-world situations, and they create an illusion of irrationality by failing to represent or understand what system of reasoning is being employed by participants. Cohen argued for the need to understand what system of

reasoning participants were using in reasoning and decision tasks, without telling them how to reason in those tasks; because in so doing we might begin to understand how people reason in the real world with information that is presented to them. Smedslund (1990) criticized the circularity of arguments that were marshalled to criticize participant behaviour in reasoning and decision-making tasks; old models of logic were used to define the way we *ought* to reason, logic was positioned as the correct method to use when reasoning, and deviation from logical reasoning was then said to be the result of participants' failure to understand the task, or evidence of participants' failure to reason correctly within the experimental tasks. According to Smedslund such arguments were not supported by concrete evidence.

According to Funder (1987, see also Lopes, 1991), psychological experiments like the old selection task induced errors in reasoning, and although such errors *could* be used to increase our understanding of what processes *are* involved in participant behaviour, they were instead used to make judgements about whether participants were reasoning correctly in the task according to normative standards; the data obtained in this way was then used to support dire conclusions about the accuracy of human reasoning and judgement (Funder, 1987). 'Errors' have been regarded as being deficits in reasoning ability. However, as Funder (1987) argued, participants' behaviour within these tasks might result in adaptive outcomes in real life decision settings; particularly in social judgement settings, in which the complexity of the context, competing goals, different relationships and roles, makes the establishment of truth and certainty exceedingly difficult. Gigerenzer (e.g., 1996) too had argued for the need to understand the social context in which reasoning and decision-making take place, if one is to understand or provide an adequate account of rationality.

According to Oaksford and Chater (e.g., 1992) rationality, and rational behaviour, is bounded by information processing constraints (e.g., Simon, 1972). Our inability to process everything that surrounds us results in competition for resources, limited access to information, and uncertainty, and it is in this context that we must reason and make decisions. According to these authors, old normative systems of

probability and logic rely on impossible standards of knowledge and certainty, and cannot be applied to real-world decision-making contexts, which are complex. Evans and Over (1996) suggested that we make a distinction between two kinds of rationality when assessing human behaviour. Rationality$_1$, which could be used to assess personal rationality; to determine what individual goals are active, and whether we are thinking, reasoning, speaking, making a decision or acting in a way that is usually a reliable and efficient way of achieving those goals. Rationality$_2$ could be used to assess whether thinking, speaking, reasoning, making a decision or acting in a given way, follows the principles of logic, or some other normative theory of reasoning or decision-making. Behaviour would thus be rational if people have good reasons for what they believe or do, which have either frequently led to goal achievement or follow an impersonal normative system. Both systems, they argued are needed to assess whether behaviour is rational.

1.2. Research with The Selection Task

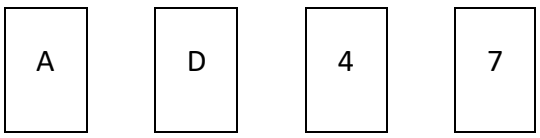
The data obtained from the selection task has therefore not always been used to increase our understanding of how people reason, or make decisions, or chose. However, as Funder (1987) argued, they could be. The first selection task was created by Wason in the early 1960s (Wason, 1995). Since the first publications of research studies in which the selection task was used (e.g., Wason, 1967), it has been one of the most well-used research vehicles within the field of human reasoning and decision-making. Throughout its history, the task has received mixed reviews (Wason, 1995). To some, it has been an irritant that can teach us nothing of value about human reasoning (e.g., Sperber, Cara & Girotto, 1995; Sperber & Girotto, 2002). However, it was through investigations with this task that the influence of multiple context and content effects on deontic reasoning and decision-making were highlighted and explored.

1.2.1. The First Selection Tasks

The selection task has often been regarded as being a test of deductive reasoning (e.g., Johnson-Laird & Wason, 1977). When the selection task was introduced,

psychologists had long been interested in what mechanisms or processes were involved in the process of deduction, and whether humans were capable of rational inference (Wason, 1966). Wason's (1966, 1968) selection task was, in part, developed to allow researchers to gain insight into what processes were involved in reasoning; failure to allow this insight was said to be a limitation of previous studies (Wason, 1966). The ability to evaluate propositions and to make valid deductions was considered to be an important human achievement. So too was the deductive testing of hypotheses, rules or generalizations, which were investigated using the selection task (Wason, 1966).

The first experiments with the selection task used what later became known as abstract versions of the task, in which participants were asked to determine which pieces of presented, potential evidence would be relevant to proving the truth or falsity of an indicative conditional. In one of the early versions of this task (Wason, 1966), participants were presented with four cards, which were placed on a surface in front of them and displayed the following letter and numbers: 'A', 'D', '4', and '7'.



Participants were informed that they 'knew' from previous experience that every card, of which these were a subset, had a letter on one side and a number on the other side (shown the cards). They were then given a rule about the cards in front of them: 'If a card has a vowel on one side, then it has an even number on the other side'. Participants' task was to determine which of the cards they needed to turn over to find out whether the rule was true or false. In this and in subsequent versions of this task, the rule or sentence that participants were asked to evaluate had the same underlying logical form – the conditional, or *if p, then q*. Only one side of the four cards was visible to participants; on one card the equivalent of *p* was visible (the antecedent was thus true), on another the equivalent of *not-p* was visible (the antecedent here was false), on a third, the equivalent of *q* was visible

(the consequent was true), and on the fourth, the equivalent of *not-q* was visible (here, the consequent was false). Participant selection patterns were markedly similar in four early selection tasks (Wason, 1968; Wason, 1969; Wason & Johnson-Laird, 1970). The most frequent participant selections were *A* and *4* (*p and q*), and *A* (*p).* These selections were regarded as being incorrect, and they seemed to provide evidence that participants were illogical or irrational; only the selection of *A and 7* (*p and not-q*) could show whether the rule was false within the presented array, according to the normative standard of deductive logic, unless a biconditional interpretation was allowed. Very few participants selected what was seen as being the correct deductive response (i.e., *p and not-q*).

Many variations in the selection task were tested, to determine *why* participants were not behaving as expected in this task. If participant competence in deductive reasoning was assumed, as it had been, what participants were doing in this task required explanation. Selection patterns in these early studies presented a challenge to researchers. Disconfirmation was thought to play a crucial role in hypothetico-deductive thought (Popper, 1959), which was thought to be acquired by the human brain at formal operations (Piaget, 1970). University students were expected to have reached that developmental stage, and yet most participants failed to select evidence that might logically disconfirm or reveal the falsity of the rule in the selection task. The conditional is used frequently in everyday life, from mundane situations to situations of great importance. Our ability to use the conditional successfully within real life situations has trivial and important consequences (e.g., Evans & Over, 2004; Over and Manktelow, 1993). Participant performance in these early studies was often interpreted as being the result of flaws, either within the task or within participants, in their understanding of the task, or their reasoning. Studies were conducted to test whether participants understood the task, and many questioned whether this task provided a suitable vehicle via which one could observe deductive reasoning (Wason, 1995). Early attempts to account for performance in the selection task, included the suggestion of bias (e.g., Evans, 1989; 1993; Thompson, Evans & Campbell, 2013); participants

considered and selected only items that were explicitly mentioned in the rule, and thus were biased towards confirming rather than falsifying a rule.

1.2.2. Deontic Selection Tasks

Research with the selection tasks led to the conclusion that deontic reasoning, decision-making and choice are influenced by content and context; by the content of conditional rules and the contexts in which they are presented (e.g., Pollard & Evans, 1987; Pollard & Gubbins, 1982). The influence of content and context on behaviour within deontic versions of the selection task, became an important focus of empirical research and theoretical accounts of conditional reasoning during the last twenty years of the twentieth century. Much of this work depended upon empirical research with the selection task. The influence of context and content on reasoning retain a central position within theoretical accounts of reasoning; these effects posed a major challenge to old models of reasoning, in which inference was said to operate upon rules that functioned independently of content and context (e.g., Cheng & Holyoak, 1985; Cosmides, 1989; Gigerenzer & Hug, 1992; Johnson-Laird & Byrne, 1991; Manktelow & Over, 1990; 1991).

A marked change in performance was observed when the hypothesis or rule presented to participants in the selection task, contained more familiar realistic content, such as what one bought in a department store, whether one tidied their room, or drank beer, rather than the numbers and letters or shapes that had been presented to participants in the earlier abstract versions of the task. The more familiar, thematic content seemed to produce more rational participant behaviour and successful deductive reasoning; many more participants selected the *p* and *not-q* cards in these tasks. This effect echoed findings observed in earlier investigations of syllogisms, in which participant performance was improved, according to normative standards, when the syllogisms contained what was regarded as being realistic, sensible content for the participants who completed the task (Wilkins, 1928). After numerous studies with these new kinds of more realistic selection task, it was determined that these tasks required deontic reasoning (e.g., Cheng & Holyoak, 1985; Manktelow & Over, 1991; Over & Manktelow, 1993). Participants in

the new tasks were asked to determine whether someone had behaved in a way that had broken or violated a legal or prudential rule, rather than test the truth or falsity of an arbitrary, abstract rule, as they had been in the first versions of the selection task. Participants were said to behave well in these tasks, because they understood these kinds of rules, which were established to guide or regulate behaviour, and the importance of finding rule violators, (e.g., Gigerenzer & Hug, 1992; Over & Manktelow, 1992). Participants' understanding of these rules was gained either from their knowledge of the world, or via a background story that had been presented in the task.

Ordinary deontic conditionals are used to present rules that are designed to regulate or guide behaviour. Deontic conditionals can express obligations, permissions, propositions (including flirting), attempts to persuade or entice, warnings, threats, and advice[1]. They can be offered genuinely, or with the intention of misleading another. They include, either explicitly or implicitly, the deontic terms *ought*, *should*, *must*, or *may*, and might be applied to thoughts, speech, or other behaviours. Deontic thinking occurs when we consider what behaviour is permitted (what one *may* do) or required (what one *must* or *should* do); that is, when deciding how to act in relation to deontic norms or rules (see e.g., Manktelow & Over, 1991; Evans & Over, 2004). Research with deontic conditionals within the selection task invigorated research into conditional reasoning, and led to many studies in which the influences of content and context[2] on deontic reasoning were explored (Manktelow & Over, 1991). Deontic versions of the selection task that resulted in a high frequency of *p* and *not-q* card selection by participants, presented participants with an opening context, in which they were often given a role to adopt within the task, such as that of a policeman who was checking to see whether the drinking age rule was being broken (Cheng & Holyoak, 1985), or that of a post office worker who was checking that envelopes were properly stamped (e.g., Johnson-Laird, Legrenzi & Legrenzi, 1972). These findings were initially criticized, due to the fact that participants would be familiar with such rules, and the task was therefore not a

[1] This list is not mean to be exhaustive.
[2] This research is considered in greater detail in chapter two.

good measure of deductive reasoning. However, it became clear in later studies that familiarity with content was in important component of what later became known as the facilitation effect (i.e., high selection of *p* and *not-q* cards)[3].

Many deontic versions of the selection task seemed to produce better reasoning; 'better' reasoning was defined in terms of adherence to deductive logic. The selection task was used to investigate deductive reasoning, and so participant performance in the task was judged against that normative standard. The facilitation effect was so called, because high selection frequencies of the *p* and *not-q* cards were said to indicate successful deductive reasoning. However, the facilitation effect was not reliable. Participant performance in the selection task was shown to be influenced by content and context. Much research energy was devoted to finding evidence that people *were* deductively competent, and to discovering which aspects of content and context made us better and which made us worse at deductive reasoning. If the selection task is understood as being a task of deductive reasoning, and if deductive logic is regarded as providing a gold standard against reasoning in this task should be judged, it is perhaps unsurprising that researchers concluded that participant performance in the selection task was influenced by context and content, and then ignored these conclusions in subsequent research studies. In these subsequent research studies, they made no attempt to control the influence of context and content that influenced participant behaviour in previous studies within the selection task. Despite their conclusions, many researchers working in this field were attempting to discover the conditions in which participants would reason 'correctly' – that is, the conditions in which they would not be influenced by the vagaries of context and content, and would then reason according to normative gold standard of deductive logic. Content and context were not of interest in themselves; they were seen as something that might 'facilitate' or 'hinder' logical reasoning (e.g., Gigerenzer & Hug, 1992).

Despite these attempts, no conditions were discovered that reliably prompted most participants to reason successfully according to the rules of deductive logic, within

[3] This research is discussed in chapter two.

the selection task. The deontic selection task was thus regarded as being problematic; it had been used as a test of deductive reasoning, but participants were not reasoning deductively within this task, at least, not successfully. Many researchers still assumed that the problems posed by this task, must either be within the task, or within participants (their failure to understanding what they were supposed to be doing in it). The lack of deductive reasoning within the selection task, was not the only difficulty associated with this task; the data obtained from the deontic versions of the selection task were messy; participant behaviour seemed to be too easily influenced by different elements of context, and content, such as task instructions, familiarity, beliefs, and perspectives, and it was not clear what participants *were* doing in this task. Effects that were obtained in one study, were difficult to replicate in another (personal communication, Ball, August 2010). That the data obtained from these many versions of the selection task were messy and seemed to be unreliable, is perhaps unsurprising given that in each subsequent study, the context and content effects that had been shown to influence behaviour in previous tasks were ignored; no attempt was made to control their influence on participant behaviour in subsequent studies. Context and content had been shown to influence thinking, decision-making and choice behaviour, but in one task after another, the implications of this conclusion for task design were ignored.

1.2.3. Ordinary Deontic Conditionals

According to Evans and Over (2004), within real world situations, when most people engage in practical deontic reasoning with ordinary deontic conditionals, about what to think and do, their behaviour is influenced by pragmatic factors. Evans (e.g., 2007) has argued that ordinary reasoning *is* pragmatic; although special instructions can evoke efforts to reason deductively, this is not the system that people use for ordinary reasoning. Evans (2007) rejected logicism as the normative standard (i.e., that people ought to be reasoning in this manner), and as a descriptive approach (i.e., to use as a way of describing reasoning as being deductively competent). Ordinary decision makers are affected by the goals that

they are pursuing, by past experiences and beliefs, and in decision-making they often satisfice (e.g., Simon, 1959, Evans, 1996; 2007; Evans & Over, 2004); they select information that seems relevant to their decision or choice, and that seems sufficient for the achievement of their goals.

Deontic reasoning is far reaching, and it is enormously important. People engage in this kind of decision-making, thinking, and choice behaviour every day. It influences factors such as what we eat, what we wear, when we leave home to travel to work, or some other destination, how we manage hazards, where we live, and how we manage work, relationships, and health. Deontic conditionals are used in attempts to guide or regulate behaviour. People refer to prudential, social, and moral rules and regulations when deciding what to think or do (Evans & Over, 2004, Over & Manktelow, 1993). According to Manktelow and Over (1991), explicit or implicit deontic rules, laws and regulations provide an essential background within which everyday reasoning takes place; they affect subjective utilities and preferences within deontic reasoning in most social settings. Evans and Over (2004) have argued that to understand these kinds of conditionals, and the use of the conditional (if) within everyday discourse, we need to understand syntax and semantics, and pragmatics – the meaning that is conveyed in speech acts and in nonverbal communications, the implications of what is communicated, and the consequences of what our actions might be (Evans & Over, 2004). Knowledge, goals, and beliefs influence communication and behaviour (e.g., Sperber & Wilson, 1995). In using everyday conditionals, people draw from information that seems relevant to the decision context. They consider the plausibility of premises and draw conclusions that seem to be probable when deciding what to think (Evans & Over, 2004), and consider what goals are being pursued, and whether particular behaviours will achieve those goals when deciding how to act (Over & Manktelow, 1993).

1.2.4. A Means to Investigate the Influence of Context and Content

The facilitation effect was most reliably obtained in studies with deontic selection tasks, when studies were modelled upon the cheater detection paradigm[4]. In this,

participants were asked to assume the role of someone who was looking for evidence of rule violations, such as a policeman or shop worker, or parent, they were told that they suspected people were breaking rules about drinking, or purchases, or tidying their room, and they were then asked which of the card array items within the task might provide evince that the rules were being broken. Given the difficulties in replicating the facilitation effect, and the sensitivity of participant performance to content and context effects, what had been viewed as being a marked improvement in deductive reasoning performance with deontic versions of the selection task, seemed to be no more than an artefact: of features of the task instructions, or the perspective into which participants had been cued, or the familiar rules or decision contexts that were presented to participants in the task. Rather than prompting good deductive reasoning, it was argued that these task features that succeeded in producing the facilitation effect, pointed very heavily towards which cards should be selected; participants merely selected the cards that had been pointed to as being relevant, rather than applying deductive logic to determine card selection in this task. The use of these contrived cheater detection paradigm studies to produce a facilitation effect, led to a damning critique of the selection task (e.g., Sperber et al., 1995; 2002). The selection task, it was argued, was not a useful vehicle via which we might improve our understanding of human reasoning or behaviour. According to Sperber at a., (e.g., 1995; 2002), for example, the selection task is not a conditional reasoning task, it is not an hypothesis evaluation task; it is *nothing but* a selection task, in which participants *merely* select the cards that have been linguistically cued as being relevant in the rule. The selection task was a test of verbal comprehension, selection was the result of unconscious inferential processes, and participants were not reasoning consciously or deliberately in this task.

These arguments are understandable given the way in which the selection task, and the data obtained from it, had been assessed, interpreted and used. However, there is no need to use the selection task as a test of deductive reasoning, or as a

[4] This research is discussed in greater detail in chapter two.

vehicle via which we point at cards and then ask participants to select them (e.g., Cosmides, 1989; Gigerenzer & Hug, 1992; Manktelow & Over, 1990; 1991; Oaksford & Chater, 1994). The selection task could be used to investigate deontic conditional reasoning, and to do so in a way that allowed us to examine more than verbal comprehension; we might also use the task to investigate factors such as goals, beliefs, expectations, and preferences, and how they influence participant decisions about how to act.

Deductive reasoning, which takes us from given propositions or beliefs, to others that necessarily follow from then (e.g., Rips, 1990), has been understood in terms of formal proofs, in which a conclusion is derived from a defined set of premises via logically formulated rules. Inductive reasoning has been thought of as being a process of adjusting the subjective probability or strength of beliefs in response to new evidence or information (e.g., Rips, 1990). Whether this neat distinction between the two kinds of reasoning has any psychological validity, has been questioned (e.g., Rips, 1990). In the deductive reasoning paradigm (e.g., Evans, 2002), people were given a set of premises, asked to assume that they are true, and then asked whether a given conclusion necessarily follows. This is not what people are asked to do in deontic versions of the selection task. And, according to Evans (e.g., 2007), ordinary conversational inferences are not deductive in kind (e.g., Evans, 2007). Evans and Over (2004) argued that deontic conditionals are rules that are established, by authorities or 'responsible people', in the expectation of obtaining benefits and avoiding costs, and that an adequate account of deontic conditionals must relate then to decision-making about expected benefits and costs.

Context had been shown to influence meaning, thought and language use for many years (e.g., Hilton, 1995; Stalnaker, 1999), and it is therefore not surprising that participant behaviour within the selection task might be influenced by these same factors. Many researchers seem to agree that inference, reasoning and decision-making are interactive, dynamic processes that are influenced by context (e.g., Elqayam, 2018; Evans & Over, 2004; Gigerenzer & Hug, 1992; Oaksford & Chater,

1994; 2008; Sperber, Cara & Girotto, 1995; Sperber & Wilson, 1995; Stenning & van Lambalgen, 2004; 2008).

The deontic selection task might be used to investigate *how* context influences practical everyday reasoning and decision-making, so that we can begin to understand what factors (and how they do) influence thinking, decision-making and behaviour in those settings. The selection task has been an important research vehicle in the past, and it could be again if it were to be used differently. It is a mistake to abandon this task, because it might not provide evidence of deductive competence, or because the data have been too messy to interpret, or because we do not yet know what participants were doing in this task. The fact that participants were not reasoning competently according to the laws of deductive logic within the selection task, does not lead to the necessary or valid conclusion that participants were not reasoning deliberatively in this task. We still do not know what participants were doing in the old versions of the selection task (e.g., Evans & Ball, 2010). This is *not* surprising given the lack of control of context and content variables that had been shown to influence participant behaviour in previous tasks – these were left free to vary in study after study after study with the selection task. This is also not surprising given the general failure to attempt to understand *why* participants were selecting the cards that they selected in this task (by asking them, for example). As Evans argued (Evans & Ball, 2010), understanding what participants are doing in the selection task *is* a challenge for future research. It is also a challenge that promises to provide a way of realizing the importance of the influence of content and context on everyday thinking, decision-making and behaviour; by incorporating them into the design of the task, by including them within theoretical accounts of these behaviours, and in so doing, making these accounts more applicable to real world complex decision settings. As Funder (1987) argued, what participants are doing in the selection task might result in adaptive outcomes in real life decision settings. This would make their behaviour rational if we used rationality$_1$ (Evans & Over, 1996) to assess that behaviour.

1.3. Emotional Influences on Reasoning

Emotions might be regarded as being an aspect of the context in which we function that influences reasoning, decision-making and behaviour. They might also be a common feature within our everyday lives, perhaps often at low levels, and thus a common influence on everyday reasoning and decision-making (e.g., Evans, 2010). Simon (1959) argued more than sixty years ago that a complete account of human rationality must include an explanation of how emotions influence decision-making and choice behaviour. There have been several theoretical accounts of how emotions might allow us to behave rationally despite our limited capacity for information processing constraints, within the many complex decision settings in which we operate; they might do this by helping to direct limited processing resources towards things that are important to us, place information into conscious awareness or trigger more automated responses, and prepare us to respond to the situations faced in different decision contexts, to achieve gains or avoid loss, to deal with appetitive, repulsive, or important information, or dangers or concerns, (e.g., Berthoz, 2003; Blackburn, 1998; Damasio, 2006; De Sousa, 1990; Evans, 2004; Goldie, 2004; Greenspan, 2000; Lambie, 2008; Mameli, 2004; Parkinson, 2004). Emotions are often responses to things that matter to us (e.g., Frijda, 1986; Ortony, Clore and Collins, 1986), and they might therefore be expected to be part of the context in which we think about and make decisions about things that matter to us; some off these matters will have far reaching consequences. If theoretical accounts of reasoning and decision-making have little or no account of how emotions influence reasoning and decision-making, they will be of limited use when attempting to understand or predicting these kinds of decision contexts or behaviour. It therefore seems important to understand how emotions influence reasoning and decision-making.

However, there have been very few experimental investigations into how emotions influence reasoning, decision-making or choice, and we are still far from understanding how emotions influence these forms of information representation, processing, and behaviour. Current theoretical accounts of reasoning, include very

brief and limited accounts of emotion, which perhaps is a reflection of the lack of data on this topic that can be drawn from empirical investigations of human reasoning. In terms of how emotions influence reasoning and decision-making, current accounts are thus hugely underspecified. Evidence that emotion can influence card selection patterns in deontic versions of the selection task, has been presented in a small number of publications. Theoretical accounts of the influence of emotion on reasoning, and previous research into how emotions have influenced performance in the selection task, are considered briefly below.

1.3.1 Emotion Influences on Reasoning: Previous Studies

1.3.1.1. Blanchette

Blanchette has conducted the largest number of studies into how emotion influences reasoning. Based on her research experience, Blanchette has argued that emotion interacts with rule content and participant experience, and that it can influence task behaviour differently as result of this interaction (Blanchette, 2006). According to Blanchette (e.g., Blanchette, 2006; Blanchette & Caparos, 2003; Blanchette, Gavigan & Johnston, 2014; Blanchette & Leese, 2011; Blanchette & Nougarou, 2016; Blanchette & Richards, 2004), negative emotional content has generally been shown to impair logical deductive reasoning in previous versions of the selection task. The cause of this impairment, she argued, results from the reduced cognitive processing resources that are available for reasoning within these tasks, which results from the drain upon them caused by the processing of negative emotions. In some circumstances, however, Blanchette has argued that negative emotional rule content can improve logical reasoning, and produce a greater frequency of *p* and *not-q* card selections. The following evidence was offered to support this argument. Blanchette et al. (Blanchette, Lindsay & Davies, 2008) presented participants with rule content that contained reference to sexual abuse. Within this study, one group of participants were identified as being survivors of sexual abuse (via a therapy service). The group of participants who had identified themselves as being survivors of sexual abuse, were said to reason more logically than a group of participants who had not identified themselves as being survivors of

sexual abuse. However, the effect was marginal, as both groups of participants performed more poorly with the sexual abuse content than they did with 'neutral' content rules.

Blanchette argued that the experiences of participants who were identified as being past victims of sexual abuse, allowed them to see the relevance of the *not-q* option within a rule that was related to sexual abuse, which resulted in better task performance (a higher selection frequency of the *p* and *not-q* cards). However, this study is not without difficulties. No measure of *what* emotions were evoked by the rules was obtained within this study, and the authors had obtained no measure of what emotions the content might evoke from any other persons, whether identified as being survivors of sexual abuse or not. In this study it was assumed that the content of the 'sexual abuse' rules had evoked negative emotions in the self-identified sexual abuse victims, and no emotions in participants in the other group. It seems entirely possible that the sexual abuse content evoked emotions in participants within *both* groups whilst they were completing this task, and that those unconsidered emotions influenced selection patterns in this task. Sexual abuse can be an emotive topic. Some people do not disclose experience of sexual abuse, others may have been adversely affected by the sexual abuse of close family members, others may know someone who has been sexually abused, some participants might have sexually abused others; all of these people may have complex emotional responses when encountering information that relates to that experience (e.g., Nemeroff, 2016; Wallis, & Woodworth, 2020). Besides the question of what emotions might have affected performance in this task, it might be argued that the sexual abuse rules might have been regarded as being more important than the neutral rule content by participants in this task, or as having more important consequences. The perceived importance of the task content may have altered participant selection patterns in this task, rather than emotion. If the grouping of participants in this study was representative of their experience with sexual abuse (i.e., sexual abuse group *vs*. no experience in the control group), the sexual abuse rule content might be more relevant and salient for participants in the sexual abuse survivor group (i.e., more familiar, realistic, and *real* because of their experience). Participant responses to the content might a product of this, rather

than their emotional responses to the content. However, no measure of emotion was obtained in this study, and no consideration was given these possibilities by the authors. The focus of Blanchette's research has been to discover whether emotions make us better or worse at reasoning logically.

1.3.1.2. Perham and Oaksford

A different approach to investigating the effects of emotional content on reasoning in altered versions of the selection task, was taken by Perham and Oaksford (2005). These authors reported the results of three experiments in which they investigated the influence of 'threatening' single words on card selection patterns, which were included within some of the conditions tested in these studies. The authors argued that these single words evoked fear within study participants when they encountered them within the task, and that this fear influenced their card selection choice. However, no measure of fear was obtained within these studies to support this argument, and no convincing evidence was presented that the words evoked fear in participants. In experiment one, participants were told the following (Perham & Oaksford, 2005, p. 695):

You are the director of a factory. Most of the factory involves manual labour, and workers cannot be allowed to get injured. Because of this you have the following rule: If you feel pain (work for 90 min), then you must stop working for a break

Participants were then told that despite their desire to improve profits, they could not permit their workers to feel 'pain' (in the *threat* condition) or become 'tired' (in the *no-threat* condition). They also suspected four workers of taking breaks in the absence of feeling pain (*threat* condition), or not having worked for 90 minutes (*no-threat* condition). A scenario then ensued in which records of their behaviour have been kept by a supervisor, each of which have been obscured by spilt coffee, and participants can see only part of their records. They need to decide whether to ask for more information about each worker, to decide whether workers were taking more breaks than permitted. According to these authors, participants felt fear when they read the word 'pain', because pain represents a threat. There is no reason to believe that participants felt fear upon reading the word *pain*, unless the

scenario evoked a memory of a frightening past event, in which case participants might have felt the fear in response to the past event. In a second scenario used in these experiments, participants were informed that they were the manager of a sports team who had suspicions about a referee; the referee had made poor decisions about injuries in the past, and their players had to leave the pitch unnecessarily. The rule in this instance was:

If there is a head (blood) injury then the player must leave the pitch

This rule included the word *blood* in the *threat* condition, and the word *head* in the *no-threat* condition. Participants were presented with the card array items one at a time and asked if they felt they needed to ask whether the player left the pitch. In this scenario, there is again no reason to believe that sight of the word *blood* evoked any degree of fear in participants, unless the participants in this group had a fear of blood, or perhaps had experienced a traumatic event that was evoked when they read this word. The authors took no measure of *fear of blood* or fear of any kind, and so there is no reason to believe that participants felt fear in response to the word 'blood'. Furthermore, within this scenario, the prospect of a head injury which was presented to participants in the *no threat* condition, seems to present a potentially greater threat than a blood injury. There was no reason to believe that the word intended to evoke fear in participants in the *threat* condition, would be more successful in doing so than the word used in place of it in the *no-threat* conditions. An additional difficulty with this second scenario, is the inclusion of a referee who is behaving unfairly against your team. The inclusion of this content, which was included in both threat and no-threat conditions, might be more likely to evoke anger than fear (e.g., Averill, 2001; Ortony, Clore & Collins, 1998).

More participants selected cards that might reveal rule violations in the factory task in the threat condition (c. 56% in the *threat* condition, c. 9% in the *no-threat* condition). No difference was observed between the *threat* and the *no-threat* condition in the sports team task (c. 47%). Participants were required to rate the *threat* words that were used in these experiments, on five-point Likert scales, according to "how threatening" they thought they were (*definitely not threatening*

to *very threatening*). It is unclear what participants intended by their ratings in this task; no account or explanation of this measure was provided by the authors. However, there is no reason to believe that participants were expressing how afraid they felt when they read the threat words (e.g., Ortony et al., 1987); they were not asked to describe how much fear or anxiety they felt when reading the 'threat' words. Unfortunately, no convincing evidence was presented within this publication that the threat words used within these studies, evoked the intended emotional response within participants.

1.3.1.3. Chang and Wilson

Chang and Wilson (2004), again, took a different approach to investigating how emotion might influence selection task performance. They reported the results of an investigation into the effects background emotional state on performance in two selection tasks. Anger and happiness were induced via a free recall task in which participants were asked to recall experiences of being cheated, *or* feeling particularly angry, *or* being the beneficiary of an altruistic act, *or* an event that made them particularly happy (the groups were independent). A social contract version (taken from Cosmides, 1989) and an altruist detection version (taken from Brown & Moore, 2000) of the selection task were used in this study. Although participants in all groups selected a significant number of *p and not-q* cards (which might have revealed evidence of cheating), participants who were induced to feel angry before completing the selection tasks, were more likely to select cards that could reveal evidence of cheating in the cheater detection, social contract task. Approximately sixty-five percent of participants in the anger induction groups selected the *p* and *not-q* cards. In the happy induction group, approximately forty percent of participants selected these cards. Participants induced into happy and angry moods performed similarly in the altruist detection task, where they were asked to identify anyone who had volunteered without seeking credit. Approximately fifty percent of participants selected *p* and *not-q* cards in this version of the selection task. The induced happy mood did not prompt participants to detect a higher number of altruists than were detected by participants who had

been induced into an angry mood; altruists were presented as being rule violators within this study.

1.3.1.4. Key Difficulties

Previous investigations into the influence of emotions on selection task performance have two major limitations. The first, is that the operationalization of emotion has been limited or flawed within most of these past studies (the Chang & Wilson, 2004, study is an exception). Blanchette et al., have adopted a valence-based approach, by investigating the effects of 'positive' versus 'negative' emotions on card selection patterns. However, it has been demonstrated in previous research that the 'negative' emotion category contains discrete emotions that can have different influences on information processing and behaviour. Collapsing the effects of emotions such as anger, sadness, guilt and anxiety into one category can mask the different effects that these emotions have been shown to have on, for example, attention, memory, judgement, choice and decision-making (e.g., Lerner & Keltner, 2000; Pham, 2007; Solomon & Stone, 2002). Furthermore, for the effects of emotion on task performance to be observed, emotion must be present, and some means of demonstrating that emotions are likely to influence task performance as claimed should be employed.

The second limitation, which is perhaps associated with the historical separation of emotion and cognition (e.g., Blackburn, 1998), is that the single goal pursued within most of these studies has been to determine whether emotions make us 'better' or 'worse' at reasoning, and in these studies better or worse have been defined in terms of whether they facilitate or hinder deductively logical reasoning (i.e., greater frequency of *p* and *not-q* card selections *vs*. other selection patterns). The question of whether emotions make us *better* or *worse* at deductive reasoning, is normative. However, with the introduction of probabilistic, pragmatic, and descriptive models of human reasoning and decision-making, the old gold standard against which most participant responses in previous selection tasks were judged, is no longer widely accepted as providing the best model of human information behaviour. Classical logic may be the appropriate standard against which to judge some behaviour.

However, there are many circumstances in which that way of reasoning would not provide the most adaptive option (see e.g., Blackburn, 1998; Damasio, 2006; De Sousa, 1990).

These limitations demonstrate that major developments observed within emotion research over the past thirty to forty years (for a review, see e.g., Rothermund & Koole, 2018), have not been included within most considerations of what influences emotion might have on task behaviour within the field of reasoning.

1.3.2. Theoretical Accounts of Emotions

1.3.2.1. Oaksford and Chater

Oaksford and Chater (e.g., 2008) provided a *very* brief account of how 'emotion' influences behaviour in the selection task (and in deontic reasoning), within their Bayesian account of thinking. This account was based upon their analysis of the Perham and Oaksford (2005) study that was designed to study the influences of fear on deontic reasoning. As discussed above, it seems highly unlikely that fear was evoked in this study, despite the claims made by the authors that they observed the results of this emotion in this study.

However, putting this issue aside, Oaksford et al. (Perham and Oaksford, 2005; Oaksford & Chater, 2008) argued against Cosmides' cheater detection account of social contracts, in which she suggested we are naturally good at catching cheaters because we have evolved within social settings, and this learning history makes us exceptionally good at catching people who cheat. Oaksford et al. (Perham and Oaksford, 2005; Oaksford & Chater, 2008) argued that when faced with a threat, such as the word *blood*, which evokes a fear response, rather than seek evidence of cheating within the selection task, we would avoid information related to the threat, and thus avoid selection of the *not-q* card on which the word blood (a threat) was clearly displayed.

They supported this claim by arguing that our response to threat is withdrawal. They argued, that in our calculation of expected utility, a regret term is subtracted from the expected utility of detecting evidence of cheating in response to the

emotion, fear. In a state of fear, participants should select fewer *not-q* cards (when this represents a threat that is clearly visible on the exposed face of that card), and place greater value in cards that display no threat. They supported this argument by drawing upon evolutionary explanations of our fear of stimuli such as snakes, spiders and blood, which explain our flight from these stimuli in terms of an innate fear response; we fear these stimuli instinctively and take flight when encountering them (e.g., Davidson, 1993; Mineka & Öhman, 2002). In response to threat, we avoid the threat, perhaps by running away from it. No other account of emotion has been provided within the information gain model.

Although avoidance might be a response to some threats, it seems unlikely that this account of fear will be adequate to account for all emotional responses to threat. Although we might react instinctively to some threats, such as spiders, or snakes (*if* we fear them), we might need to appraise some situations or objects more extensively to determine that they represent a possible threat, and what kind of threat is presented by them. We might *then* hide or run or somehow avoid a threat (via a withdrawal of processing resources, perhaps), but we might also take more directed action to deal with them. Our response to threat seems likely to be influenced by the nature of the threat, and the context in which it is encountered. No other emotions have been considered within their information gain account.

1.3.2.2. Evans

Evans has argued that by neglecting emotion within thinking, reasoning and decision-making accounts, we have left out an essential component of what makes us sentient beings (Evans, 2010). Furthermore, he argued, that it is often emotions, and not thoughts, that control our actions; without emotions, there can be no rationality, because without emotion we do not care (e.g., about life, outcomes, or goals). Emotions, as Evans has portrayed them, are a product of our old minds, they reflect evolutionary instincts or learned responses; in doing 'what feels right', and in 'going with our gut', we are being guided by emotions. Emotions influence everyday thinking and decision-making via System 1, by encouraging stereotypical, unreflective responses. Reason, according to Evans, delivers good sense, and it is

this capacity that elevates us above other animals; emotions are leashed to the selfish gene, direct behaviour towards the gaining of pleasure and the avoidance of pain, and control our behaviour for their own ends. In his account of emotion, Evans has supported his arguments with references to racism, stereotypes and attachment, and lust. Given the general nature of Evans' account of emotion, and the absence of explicit references to how emotions might direct or influence behaviour within specific settings (beyond generally encouraging stereotypical attitudes, or instinctive behaviours), it is not possible to draw predictions about how emotions will influence behaviour in this research programme from this account.

1.3.1.4. Cosmides & Tooby

Cosmides and Tooby (2000) have provided an evolutionary account of emotion, although in this they described only one emotion, which was fear. Fear, according to these authors, results in shifts of perception and attention *towards* possible threats that might not otherwise be perceived; fear heightens our sensitivity to threat, and reduces the signal detection threshold required to respond to something *as if it is* a threat. We are therefore biased towards interpreting something as being a threat, when feeling fear, which will result in a higher rate of false alarms than might be triggered when not feeling afraid. Fear also shifts our goals, according to these authors, so that safety becomes our priority – planning, information processing and coping resources are focused upon the current context; other goals (such as obtaining food, or courting a mate, or finding reward in a newly acquired skill) might be abandoned whilst we attend to threats. Our surroundings become tagged in terms of how they are associated with the current threat (do they present danger, or offer places to hide, or sources of help). Memory processes are directed towards retrieval tasks that might assist us in dealing with the threat; we search for similar events or occasions that might help us to interpret and cope with the current threat. Communication processes are harnessed to respond to the situation, although whether we emit alarm call or are silent will depend upon the context. Specialized inference systems are activated, that allow us to analyze the

threat, and will provide clues as to how best to respond to the particular threat (the authors use the example of attempting to escape a lion within their account, and assessing whether he has eaten recently, or has seen you, in the determination of how to act). Specialized learning systems are also activated, which will record what happens during this occasion; this recording might then influence our behaviour on subsequent occasions. Physiological changes take place that allow us to respond physically, in flight in immobility, to the threat. Finally, behavioural decision rules are activated, which, dependent upon the threat, direct behaviour to respond to the threat (e.g., by hiding, taking flight, acting in self-defence, or in tonic immobility). This account offers a greater variety of responses to threat than have been offered by Oaksford et al. or Evans (above). However, very little research is cited in this account of fear offered by Cosmides and Tooby (2000), and the authors make no predictions within it about how fear will influence behaviour in present day decision settings; their examples relate to dealing with threats in our evolutionary past. Although it is difficult to draw hypotheses from this account about how participants might respond within the selection task, when feeling fear, their account does suggest that more (rather than less, as Oaksford et al. argued) information processing resources might be directed towards a threat, to determine how we might deal with it.

1.4. Emotion: Information Processing and Representation

Given the scarcity of specific clues or guidance as to how emotions might influence participant behaviour in the current research investigations, research that has investigated how emotions influence other kinds of information representation and processing, which might be recruited whilst reasoning and decision-making, is considered below. On the basis of this research, might be possible to make clearer predictions about how emotions will influence participant behaviour in the new selection tasks. Three emotions were focused upon in the current research. These were happiness, anxiety, and fear. These three emotions were chosen for inclusion within this research because they might be thought of as being basic emotions (e.g., Frijda & Parrott, 2011; Izard, 1992; Johnson-Laird & Oatley, 1992), and they provide

a good place to start the process of investigating more thoroughly, how emotions influence reasoning and decision-making.

Much research effort has been devoted to the investigation of how emotions guide behaviour and modulate or direct information processing and representational resources. Emotions signal the occurrence of potentially important or appetitive or repulsive objects or events. Information processing and representation resources are limited; we cannot deeply process or represent much of the stimuli that we encounter (e.g., Sander, Grandjean & Scherer, 2005). The attentional system, for example, has been shown to have limited capacity, and attention is therefore selective; we cannot attend to everything (e.g., Richards, Benson, Donnelly & Hadwin, 2014). Emotion seems to be a mechanism that directs attentional processing resources towards emotion-congruent stimuli, to allow efficient detection of events that are relevant to our goals, or concerns, or preferences, and are part of the marshalling of resources to prepare us to respond to and adapt to circumstances that unfold within the complex contexts in which we operate (e.g., Frijda, 1986; Frijda, Manstead & Bem, 2000; Isen, 2000; Pool, Brosch, Delplanque & Sander, 2016; Pourtois, Schettino & Vuilleumier, 2013; Sander et al., 2005)

1.4.1. Anxiety

Richards, Benson, Donnelly, Hadwin (2014) have suggested that anxiety is associated with two separable attentional processes. One is an increased vigilance for threatening stimuli in elevated states of anxiety, which they described as a state of hypervigilance that keeps the cognitive system alert, and in a state of readiness to detect threat. These processes rapidly scan the surrounding environment for threat, and result in a broadening of attention in anxious states that is focused upon the detection of threat. These processes show a bias for threat-related stimuli, and result in the enhanced detection of threat in anxious states. The consequence of this information processing is that other tasks might suffer, because attentional resources are prioritising threat detection. The second kind of attentional process associated with anxiety, discussed by these authors, is a selective attentional bias for threat-related information. These processes are

associated with an orienting to threat, a narrowing of attention on threat-related stimuli, a rapid engagement with threat, attentional capture (in some contexts) and a delayed disengagement from threat-related stimuli. The allocation of attention resources to threat-related stimuli allows further processing, as does the attentional capture by threat-related stimuli, and the delayed disengagement from threat.

Impairment of attentional control might underlie vigilance for threat in anxiety, and result in difficulties actively disengaging from threat-related stimuli (Eysenck, Derakshan, Santos & Calvo, 2007); it might be difficult to switch attention to non-threat-related stimuli when anxious, and this sustained attention on threatening stimuli maintains anxiety. High anxiety in non-clinical populations has been associated with the hypervigilant scanning that is observed in clinically anxious populations (Richards et al., 2014). Although these findings have been obtained in lab-based visual attention studies, the authors believe that similar behaviours would be seen outside of a laboratory setting. Anxiety has also been associated with a lower threshold for evaluating ambiguous information as being threatening (e.g., Mogg & Bradley, 1998). According to Williams (e.g., 1997), the intensity of anxiety might influence attentional processing; high anxiety might direct attention towards and hold resources upon the processing of threat, whilst low anxiety might result in a shifting of attentional resources away from threat-related information after initial processing and identification (see reviews of information processing in anxiety by Mathews, 1990; Mathews & MacLeod, 1994; Mogg & Bradley, 1998; Öhman, 2000; Richards et al., 2014).

In anxiety, therefore, threats are detected automatically, and attention is drawn to a stimulus to evaluate it further via controlled processes. Anxious people tend to focus more on threatening information in their environment. This processing bias is automatic and exceedingly fast, acting before the content of processed information comes into consciousness. It orients us towards potential threats, functions to attract attention towards potential threats within our surroundings and allows for a more thorough analysis of potential threats. Anxiety thus delivers information for a more thorough analysis, by slower or later information processing. Anxiety can also

result in a biased interpretation of the perceived stimuli, particularly if the meaning of perceived objects or events are ambiguous. It has been argued that the expectation of threatening or negative events can result in an expectation bias, in which we are more likely to interpret perceived behaviours or events in a manner that matches our expectations. If we expect someone to behave in an impolite or threatening manner, we are more likely to interpret their behaviour as being impolite or threatening. It may be that anxiety activates or primes associated memories of past behaviours, objects or events. A network of information about past anxiety experiences is then more available as a source of information or lens that we see through and use to interpret or 'recognize' the nature or meaning of current behaviours, objects or events. Activated memories might include associated meaning, actions, outcomes, and consequences (e.g., Öhman, 2000). Arousal is activated automatically, and is thought to amplify these effects, enhancing biases by making information that is focused upon seem more significant. Arousal also provides metabolic support for possible flight or fight responses to cope with threat. In some instances anxiety might be evoked immediately in response to first contact with stimuli (such as in response to phobias, or stimuli related to trauma); in other anxiety might have more cognitive components involved in the appraisal of stimuli, the interpretation of language, or behaviours (e.g., Öhman, 2000).

1.4.2. In anger

Anger was included in the first study in the research that is presented in this thesis, because participants in this study would be presented with threat-related stimuli, with the intention of evoking anxiety. However, as anxiety and anger are both responses to threat, it seemed wise to include a consideration of whether participants might react differently to the presented threat if they were in an anxious or angry state. Anger has been described as a response to a perceived, potential or realized threat, when something or someone is appraised as being responsible for the harm caused by the threat; anger might be evoked when one feels that they have been treated badly or unfairly (e.g., Averill, 2001; Ortony, Clore & Collins, 1988). Anger has often been described as being associated with the

motivation or tendency to approach a threat, so that one can deal with or arrack the source of threat; however, anger can also be associate with the motivation to withdraw, in order to avoid a source of threat (Stewart, Silton, Sass, Fisher, Edgar, Heller, Miller, 2010). Anger may disrupt the allocation of attention within non-emotional tasks, as angry people have been shown to display an attentional bias towards and away from threat-related words (Eckhardt, & Cohen, 1997; Maoz, Adler Bliese, Sipos, Quartana & Bar-Haim, 2016; Smith & Waterman, 2003; 2004). Anger, like anxiety, has been shown to result in heightened attention *towards* threat-related stimuli, with a narrowing of attention on threat-related stimuli, but not the rapid scanning of the environment for potential threats. The attentional bias associated with anger, thus seems to be more focused on processing identified threats rather than searching for potential threats. What determines whether attention might focus upon or withdraw from threat in an angry state is not clear. It may be that this bias is associated with the intensity of anger, however, it might also be influenced by context (dependent, for example upon opportunities for responding to threat, the perceived importance of the threat, and the relevance of the information to the source of one's anger). Anger, like anxiety and happiness, has been associated with an emotion-congruent interpretative bias; angry people have been shown to be more likely to interpret ambiguous information about the behaviour of others in vignettes, for example, as displaying hostility or being threatening, or as being driven by negative intentions, and to do so more than anxious participants (Hazebroek, Howells & Day, 2001, Maoz et al., 2016; Wenzel & Lystad, 2005). Angry people have been shown to be more likely to interpret the behaviour of others as being driven by anger, or as showing hostility, or as revealing their negative intentions. Evidence of a hostile expectation bias has also been reported; angry people might be more likely to expect others to behave in a hostile manner, and so this bias is related to the prediction of future events (e.g., Bushman, & Anderson, 2002).

1.4.3. Responses to Threat

Fear and anxiety are both systems that are biased towards the detection of

potential threats. They are defence responses that are part of an alarm system that functions to keep us away from potentially harmful or deadly threats. If our alarm system is to function effectively, the perceptual system must be effective at locating potential threats, and we must be able to deploy defences rapidly. Anxious awareness can serve to keep someone in a state of alertness for the occurrence of a dreaded event (e.g., Greenspan, 2004; Öhman, 2000). In terms of survival, false negatives (i.e., failure to detect a deadly or damaging threat, to trigger a threat response to a harmful stimulus) can be more costly than false positives (i.e., the triggering of a threat response to a harmless, non-threatening stimulus) (e.g., LeDoux, 1996).

1.4.3. Happiness

In a meta-analysis of research into attentional biases towards positive stimuli, Pool et al. (2016) provided evidence of orienting towards appetitive stimuli, and difficulties disengaging from these stimuli; similar to those observed for threat-related stimuli, but here the focus was on appetitive stimuli. These authors argued that the influence of positive stimuli on attentional resources is moderated by the relevance of stimuli to current concerns; it is larger when the stimuli are relevant to current concerns, and when the stimuli are relevant to common or frequent concerns. A rapid involuntary attentional bias for emotional stimuli (for threat and rewarding or appetitive stimuli), is thought to make these stimuli more salient, more likely to enter conscious awareness and influence behaviour (Pool et al., 2016; Vuilleumier, 2005). The observations of a positive attentional bias for rewarding stimuli were largely obtained by studying responses to single words, faces or visual scenes. However, the authors believe that they should generalize to more complex real world environments.

Happiness has been associated with an attentional bias for positive information (e.g., Strauss & Allen, 2006). Positive memories seem to be more accessible when we are in a happy mood, and we seem to be more likely to use past positive experiences as a lens through which to view current events (e.g., Ashby, Isen & Turken, 1999; see review by Isen, 2000). Positive stereotypes or rules of thumb or

shortcuts, such as the feeling of rightness, have also been shown to be used as decision-making strategies or to guide behaviour in happy moods; you might do what feels good or right. (e.g., Bless, Bohner, Schwarz, & Strack, 1990; Bodenhausen, Kramer, & Süsser, 1994; Clore & Gasper, 2000; Melton, 1995; Wang & Thompson, 2019). Happiness has been associated with a broad attentional focus, a higher degree of flexible thinking and more creativity in problem solving (e.g., Isen, 2000; Pool et al., 2016). However, attentional processes are here focused on the processing of positive or neutral stimuli (e.g., Grafton & Macleod, 2017); the broad attentional processing that is dedicated to the detection of threat in an anxious state is sensitive to reward in a happy emotional state. Negative information has been shown to be either avoided, disengaged from or processed more shallowly in a happy mood state (e.g., Isen, 2000). However, this response might depend upon the context – the importance of the task, the nature of the materials, and what the consequences of not attending to the information might be. Negative or threatening stimuli might evoke a negative emotional response if the stimuli are important and meaningful to the person who encounters it (Isen 2000).

Positive emotions are thought to encourage play, exploration, learning, and the building and maintenance of social bonds, and to increase our opportunities for reward. These are valuable resources that we can draw upon when needed in other settings, that can benefit us in many ways (e.g., Fredrickson, 1988; Frijda, 1986; Izard, 1977). There is no experimental evidence that the attentional bias towards threat that is associated with anxiety, is present when in a happy emotional state. Although we must still be sensitive to the possibility of threat when in a happy mood, to ensure our survival, we are not in the heightened state of high alert for threat that is associated with anxiety (e.g., Izard, 1977). When happy, we do not seem to search for possible difficulties, unless errors occur or our performance is somehow impaired (e.g., Weiner, 1985; Forgas, 2000; Fredrickson, 1998).

The research presented above, about information processing and representation tendencies that have been associated with happiness, anxiety and anger, was used

to formulate hypotheses in the selection tasks that are presented in this thesis (these are presented in chapter six).

1.5. Current Research: An Exploratory, Descriptive Endeavour

In light of how little is known about how emotion influences reasoning within general or specific decision contexts, the current research programme was largely an exploratory endeavour. One goal pursued within this research, was to see whether it would be possible to create a way of evoking and measuring emotions more effectively than had been achieved in most previous reasoning studies. To do this, a new selection task was developed. A second goal pursued in this research, was to see whether it would be possible to control the key content and context effects that had been observed in previous studies with the selection task. Unless this was achieved, it seemed unlikely that the data obtained within the current research studies would be easy to interpret – given the messiness of previous data sets discussed above. A third goal pursued within the current work, was to investigate how three key emotions (happiness, anxiety, and anger) might influence reasoning, decision-making and choice behaviour, within the decision contexts that were presented to participants in the new selection tasks. It was hoped that the result of this research would be the creation of a new and important task, by which we might investigate reasoning and decision-making in complex realistic decision settings. It was also hoped that the data obtained from studies with the new selection task, would allow us to begin to understand and model how these emotions might influence reasoning, decision-making and choice in real world decision settings that are similar to the ones investigated herein; and thus make this work applicable to real world settings.

The selection task has been discarded prematurely. There is no need to use this task to investigate deductive reasoning. It would be a mistake to ignore the findings that were obtained in previous versions of the selection task; that content and context influence reasoning and decision-making. These factors influence everyday reasoning and decision-making; we therefore need to understand how they do this,

and what the consequences of their influence might be, if our models are to be of practical use within many applied settings. The selection task offers a way of simulating real world decision settings, if adapted, and a way of investigating the influence of emotion and other elements of context and content on pragmatic everyday reasoning and decision-making, which might present us with more complex decision contexts than are presented to participants in other reasoning tasks. As Funder (1987) argued, participants' behaviour within the selection task might result in adaptive outcomes in real life decision settings; particularly in social judgement settings, in which the complexity of the context, competing goals, different relationships and roles, makes the establishment of truth and certainty exceedingly difficult.

The development of the new selection task is presented in chapters 2 to 5; in these are included many of the factors that shaped the construction process, and the process of validating the new selection tasks. Studies with the new selection task are presented in chapters six to nine. A final summary and discussion of the research that has been conducted in this research programme is then presented in chapter ten.

1.6. Summary

In this opening chapter, a summary has been provided of the way in which the selection task has been regarded and used since its introduction in 1966. This summary has been used to demonstrate the changing focus of research during this period: moving from old normative models of decision-making and choice, to an appreciation of the important influence that context and content can have on human reasoning and decision-making behaviour. The recent rejection of the selection task, which has been an important research vehicle in the field of reasoning, and the reasons for rejection, have been considered in this chapter. Following on from this it has been argued that it would be a mistake to discard this task; the reasons for this have been discussed. A brief review of research into how

emotion influences reasoning has then been presented, as has an account of how emotion has been presented in theoretical accounts of reasoning and decision-making. In conclusion, it has been argued that further work is needed to improve our understanding of how emotions influence reasoning and decision-making. The goals of the current research have then been presented, which seek to remedy this gap in current knowledge.

Chapter Two. Key Factors That Influenced Card Selection: Previous Selection Task Studies

This chapter provides an outline of the first stage of the development of the new selection task. In this, the key goals that were pursued in this research are described. The key factors that have influenced participant performance in previous deontic versions of the selection task are then identified; some of the studies in which their effects were identified are discussed, so that the influence of these factors might be more easily understood and subsequently controlled in the new selection tasks.

Chapters two to five detail the development of the new selection task; they include an account of the practical and theoretical elements that were involved in the construction of the new task, and the process of validating the emotional nature of the new selection tasks. These chapters demonstrate the difficulty of the work involved in developing the new selection task; within them are presented examples of early versions of the selection task that were ultimately discarded. These early examples have been included within the thesis, because they show the theoretical development that has been achieved within the creation of the new tasks. They also demonstrate the detail and controls that have been included within the finished versions of the new selection task. Chapters six to nine present research that was conducted with the finished versions of the new selection task.

2.1. Development of the Construction Process.

2.1.1. Initial Goals

At the start of this research, one main goal was clear, which was to investigate how emotion influences reasoning. The motivation for this has been outlined in the opening chapter of this thesis. In order to do that successfully, a robust way of doing it was needed. The selection task was not at this time generally regarded by

academics working within the field of reasoning and decision-making, as being a tool that could provide meaningful insights into reasoning, thinking or decision-making, and there was little interest in research in this task (personal communication, S. Elqayam, September, 2014). After the long period in which this task had been the focus of much research attention, and many important debates, it had fallen out of favour: the data were messy, findings appeared to be inconsistent, the results were perhaps no more than the product of artefact, too many factors seemed to influence participant behaviour in this task. However, there was still research interest in the selection task within the field of reasoning (e.g., Evans & Ball, 2010); what participants were doing in this task was regarded as being a challenge for future research. Furthermore, the selection task provided a promising vehicle for this research endeavour. No other reasoning task provided the same opportunities for situating participants within a realistic decision setting, and allowing the investigation of reasoning and decision-making about everyday social contracts, *and* the potential of acting as an effective stimulus to emotion so that the effects of emotion on reasoning and decision-making could be observed. As emotion would be induced both before and within task, to allow a more dynamic and thorough investigation of its effects, the task would need to evoke the targeted emotional response (i.e., happiness, or anxiety). More precisely, the content that was contained within the selection task would need to serve as the stimulus to the targeted emotional response. Emotions might be induced by a task that participants are asked to complete, such as giving a public speech, or competing against others in a test of intelligence. In those instances, the task might be expected to evoke emotions (e.g., hope, joy, fear, pride, regret). In this programme, the goal was not to evoke happiness or anxiety as a result of having to complete the selection task. If that was the goal, other tasks might serve that purpose more effectively and efficiently. The goal was to evoke happiness or anxiety in response to the everyday events that were depicted in the task, to examine the influence of these emotions on inferences and responses in those settings. No convincing evidence that a previous version of the selection task had acted as an effective stimulus to an emotional response, had been presented in previous published studies. Studying

emotion was perhaps therefore not easily achieved. These circumstances prompted a review of what task elements might be required for the selection to task to act as an effective stimulus to an emotional response. At this early stage of the research process, identification of these requirements provided a guiding framework within which the research could progress.

2.1.1.1. A Suitable Selection Task Vehicle. Emotion as Context and Content.

Several goals, not independent, provided the guiding framework within which the revised selection tasks were constructed. First, was the development of a selection task/vehicle that would allow investigation of what effects the targeted emotional responses (i.e., *anxiety*, *happiness*, and *neutral*) might have on task selection behaviours. In light of the preceding discussion of the nature of how emotions might influence information processing and representation, emotion was operationalised as both a *within-task* variable, which would act as a stimulus to emotional responses whilst participants were completing the selection task, and as a *within-person* variable, which would provide a measure of, and some control over, the context in which participants encountered the *emotion-as-task-content* conditions. The same emotion conditions (i.e., *anxiety*, *happiness*, and *neutral*) were manipulated within both emotion variables. This description of emotion as a *within-task* or a *within-person* variable provides an overly simplistic categorisation of emotion. However, the description is not intended to provide a coherent account of the nature of emotion; it is used to pinpoint the temporal location of the emotion induction conditions that are operationalised within this project, in relation to participant completion of the selection task. The *within-person* variable has been operationalised as an emotion induction that would be encountered by participants before completion of the selection task. This should allow some control over the emotional state or context in which participants encounter the selection task. Operationalising emotion as a *within-task* variable, then allows us to investigate how emotion that is associated with the decision context might influence reasoning, or selection behaviours, in the selection task. The emotions evoked during each induction procedure (i.e., *within-person*, and *within-task*) could

be about the task, not about the task, or about the task and not about the task. During this initial stage of development, the first emotion induction was intended to induce emotions that were unrelated to the task, and the second induction was intended to induce emotions that were related to the task. The intentional focus of emotions between conditions (e.g., Goldie, 2002; Lambie & Marcel, 2002), and the relevance of emotional responses to the selection task (e.g., Angie, Connelly, Waples, & Kligate, 2011), thus differ between and within these two emotion variables. Subsequent research investigations would be needed to discover whether a change in this focus would alter participant behaviour.

2.1.1.2. A Suitable Selection Task Vehicle. Effective Stimuli to Emotional Response.

The second goal was the development of materials that function as *effective* stimuli to the targeted emotional responses (i.e., *anxiety*, *happiness*, and *neutral*). If the initial emotion induction or *emotion-as-task-content* conditions fail to evoke the targeted emotions in participants, then any inferences about the effects of emotions on reasoning or selection behaviours within these tasks would be invalid. Development of materials that evoke the targeted emotions, would allow measurement of the effects of these emotions on behaviour within the selection task. This point is not a trivial one. Materials that were used to evoke emotions have been used in many previous empirical investigations of the effects of emotions on different aspects of human behaviour (e.g., attention, memory, perception, reasoning). In many of these studies, no convincing argument was presented that the stimuli used to evoke emotions in these studies served as effective stimuli to either the investigated emotions or to a specific emotional response (e.g., Angie, Connelly, Waples & Kligyte, 2011; Blanchette, Gavigan, & Johnston, 2014; Blanchette & Leese, 2011; Blanchette, & Nougarou , 2016; Lerner & Keltner, 2000; McKenna, 1986; Perham & Oaksford, 2005; Solomon & Stone, 2002; Zeelenberg, Nelissen, Breugelmans, & Pieters, 2008).

2.1.1.3. A Suitable Selection Task Vehicle. Ecologically Valid, Everyday Decision Contexts.

2.1.1.3.1. Familiarity

The third goal was the development of a selection task that would present participants with ecologically valid, realistic decision contexts and everyday agreements, which they were likely to have experienced before encountering them within the selection task. Participants' experience of the developed contexts may have been achieved in real-world settings such as at leisure, family, social or formal events, in which they were physically situated or experienced via an online medium, and through either first-hand encounters or via observation of the behaviour of others. Experiences of the developed contexts might, alternatively, have been gained through more virtual encounters, whilst reading, or viewing film, for example, or via some other medium.

2.1.1.3.2. Multiple Influences on Behaviour

An ecologically valid and practically useful understanding of everyday decision behaviours will not be attained, unless the means used to investigate these behaviours provide a reasonable model of the contexts in which such decisions are made. It seems unlikely that any one aspect of *any* situation would be sufficient to determine behaviour, other than some of our, automatic, ballistic or reflex responses. This is true within everyday, mundane scenarios, such as deciding what to eat for lunch, or where to meet a friend, whether you will provide food for an event as you had promised, what to wear for any given event, or whether you will give someone a lift home this evening as you had promised to do. What to eat for lunch, for example, might be influenced by factors such as the presence and strength of hunger, time elapsed since last eating, the availability of different foods, time available for lunch, the presence or absence of nausea, lunch companions, what activities were expected to take place after lunch, weight loss goals, and budget. It is also true of more infrequent, extreme or life-threatening events, such as being held hostage at gunpoint, or deciding whether to have a treatment that

could extend your life, after receiving a diagnosis of a life-limiting or terminal illness. In the first case, behaviour might be influenced by factors such as a concern for, or wish to protect or support other people, the value placed on reputation, the value placed on those involved in the event staying alive, or unharmed, physically and psychologically. It might also depend upon existing behavioural tendencies to give way or to fight back when threatened, and on the believed probability that the person who is holding the hostage will carry out their threats, if their demands are not met.

Multiple factors within any almost any scenario determine behavioural responses to events (e.g., Hogarth, 1991; Simon, 1959; 1983). Our responding to multiple rather than single factors is thought to play a vital role in our ability to adapt to our environments, in part because this allows us to take account of more than one person, object or event, and in part because this allows us to predict what might happen next. It seems unlikely, therefore, that studies and measurements of the effects of single, apparently isolated variables on human behaviour, in which no consideration is given to the possible effects of other key variables that have been shown to influence the behaviours under study in similar settings, can provide ecologically valid models of behaviour that generalise beyond the experimental setting in which they were obtained (e.g., Simon, 1959; Wetherick, 1995).

Previous investigations with the selection task have shown that there are multiple influences of content, context, perspective and instructions on participant behaviour in this task (see e.g., Evans, 1982; Gigerenzer & Hug, 1992; Griggs, 1983; Manktelow, 1981, for reviews). And yet these findings seem to have been ignored. No more than one or two variables have been operationalized in reasoning studies, and little or no consideration has been given to the possible effects of other variables on participant behaviour, including those variables that have been shown to influence task selection in previous studies. If these factors influenced task performance in previous studies, it is not clear why researchers ignored their influence in subsequent tasks. Not measuring or controlling these influences on behaviour does not result in an absence of their influence on that behaviour. It seems possible that well-known failures to replicate the apparent facilitation effects

that were observed in some of the thematic versions of the selection task (e.g., by Griggs & Cox, 1982; Manktelow & Evans, experiment 5, 1979; Yachanin & Tweney, 1982), were caused by the effects of other key variables that had been shown to influence behaviour in the selection task, that were ignored in these attempts at replication.

Difficulties replicating the effects observed in previous research studies are not limited to investigations of thinking, reasoning and decision-making. Neither is this approach to research. This limitation in approach and method is understandable within an historical and institutional context. The scientific tradition followed by experimental cognitive psychologists has perhaps encouraged the view that variables could be investigated and considered in isolation (for a discussion of this, see e.g., Hepburn, & Andersen, 2021).

However, in light of what research with deontic versions of the selection task has revealed about the influence of instruction, perspective, content, and context on thinking, reasoning and decision-making, it is essential that we include consideration of these factors in future research. To not do so would be to fail to take account of what we have learned and continue to limit the ecological validity and reliability of our models. Selection task materials developed for the current project, therefore, needed to include controls for, at least, the possible effects of key factors that have been identified as having significant effects on selection patterns, in previous versions of the selection task. The achievement of this goal would also allow investigation of reasoning or decision-making within a context that attempts to approximate a realistic decision setting, more comprehensively than has been achieved in previous versions of the selection task.

2.1.1.3.3. Variables Function in Interaction

In addition to the inclusion of multiple variables, and familiar content, the achievement of ecological validity requires additional consideration. There is a great deal of evidence that context influences many aspects of information processing, for example, visual perception and attention (e.g., Olson, Chun, & Allison, 2001; Rayner, 1998; Todorović, 2010; Vuilleumier, 2005), motor control

(e.g., Foster & Higham, 2014; Girardi, Lindemann, & Bekkering, 2010; Song, 2019), questionnaire responses (e.g., Schwarz & Oyserman, 2001; Schwarz & Sudman, 1992), social judgements (e.g., Forgas, 1991; Simpson, Laham & Fiske, 2016); memory (e.g., Bookbinder & Brainerd, 2016; D'Esposito & Postle, 2015; Shields, Sazma, McCullough & Yonelinas, 2017; Yee & Thompson-Schill, 2016), reasoning and decision-making (e.g., Evans, 1991; 2002; Evans & Feeney, 2004; Hilton, 1995; Mercier & Sperber, 2011; Oppenheimer & Kelso, 2015; Shah, Shafir & Mullainathan, 2015; Pollard & Evans, 1987; Walasek & Stewart, 2019). The contexts in which everyday decision-making takes place are dynamic, and the factors that influence behaviour do so in interaction rather than isolation (e.g., Griggs, 1983; Manktelow & Evans, 1979; Simon, 1959). As variables function in interaction, it is in interaction that we need to understand their possible effects. It would be wrong to assume that variables studied in isolation (or, *as if* they were operating in isolation), will have similar effects in different contexts where different variables are active or present.

2.1.1.4. A Suitable Selection Task Vehicle. Situated within Previous Selection Tasks.

The fourth goal was thus to situate new task materials in relation to materials that have been used in previous selection task research projects. In part, this focus was important to ensure that the findings from studies in which the developed materials were used, might be compared with findings reported in previous research studies. In part too, this focus was defensive; to ensure that if data obtained from the new selection task studies differed from those reported from previous studies, it would not be easy to locate the cause of any differences within factors that had been shown to influence selection behaviours in previous studies (and dismiss them in this manner). The control of these factors within and between current experimental conditions, should allow for a more meaningful and detailed analysis of obtained data. Findings reported in published accounts of previous studies were, therefore, used to guide the development of materials for this project.

2.1.2. Previous Selection Task Materials: Search for Construction Guidance.

These initial goals provided valuable guidance for the construction of selection task materials that would function as adequate research vehicles. They were, however, too underspecified to serve as practical tools that could detail specifically how one should develop materials for the selection task. A search of published peer-reviewed articles of empirical studies that had used the selection task, review articles and discussions of such tasks in peer-reviewed journals and book chapters, was, therefore, conducted to investigate whether more detailed guidance as to what process should or could be followed when developing a selection task had been published. This search was conducted using PsycINFO, Science Direct, and Google Scholar for English language research studies that were published between 1968 to 2012, using the terms *Wason$ and Selection task$*, *Wason$ and Selection task$ and review$*, *Wason$ and Selection task$ and devel$ or construct$*, *Wason$ and Selection task$ and problem$*, *Wason$ or Selection task$ and review$*, *Wason$ or Selection task$ and devel$ or construct$*, *Wason$ or Selection task$ and problem$*.

This search process returned more than twenty-two thousand articles. Within these publications, however, no details of the procedure or process used to construct selection task materials were easily located. There seems to be no established procedure for constructing selection task research materials. No account of the processes that were used to develop previous versions of the selection task, were included in publications that detailed or discussed the data obtained from investigations in which they were used. The materials used in previous reasoning studies seem to have been constructed to provide what the researchers, and perhaps one or two colleagues, considered to be appropriate content for the research questions they were used to test, with little or no justification offered for the adoption of this method (personal communication, K. Manktelow, October, 2008).

This means of constructing research materials is not limited to research in which the selection task has been used, or to investigations of human reasoning. A similar

situation was evident within the emotion vignette literature. In the absence of a detailed practical guide within the reasoning literature that might be used to develop selection task materials, a search was conducted of the emotion literature for guidance as to how one could develop written scenarios, or vignettes (e.g., Parkinson & Manstead, 1993; Smith, Haynes, Lazarus, & Pope, 1993), that would be designed to evoke specific emotional responses. This search was conducted via PycINFO and Science Direct, focused on peer-reviewed, English language journal articles published between 1968 to 2012, using the terms *emotion$ and vignette$*, *emotion$ and vignette$ and design$*, *emotion$ and vignette$ and review$, emotion$ and script$ and vignette$*, *anxiety or anxious$ or fear$ and vignette$*, *anxiety or anxious$ or fear$ and scenario$*, *anxiety or anxious$ or fear$ and script$*, *joy$ or happy$ or happin$ and vignette$*, *joy$ or happy$ or happin$ and scenario$*, *joy$ or happy$ or happin$ and script$*. More than nine thousand articles were returned in these searches, however, no defined procedure or process that could be used to construct written scenarios for the selection task was discovered within the returned publications.

In light of the above, a new process that would provide a valid and reliable method for constructing selection task materials was developed within the current research. Although it had not been published as guidance on how to construct selection task materials for use in empirical research studies, some guidance for this process was obtained from publications of previous selection task studies. Factors that were identified as having influenced selection patterns within published studies of previous selection tasks, were identified as factors that should be controlled within materials developed for this project.

The key initial motivation for detailing the development of the new selection task materials, was concern that the new materials would not be accepted as being valid versions of the selection task by the academic reasoning community. More specifically, the concern was that any findings obtained from studies in which these materials were used would be separated from discussions of findings from previous studies; if the new tasks were viewed as being flawed, or crucially different in nature from previous tasks, it would be easier to categorize their data as being

about something else, or as having limited relevance or application. Debates of this nature are evident within previous selection task publications, and such interpretations were presented as providing good reasons to dismiss data that had been obtained in previous studies (e.g., Fodor, 2000; Sperber, Cara, & Girotto, 1995; Sperber & Girotto, 2002). It was important to ensure that data obtained from these new selection tasks could be discussed meaningfully in relation to findings from previous versions of this task.

2.1.3. What Should the New Selection Task Do.

In addition to the concerns outlined above, it seemed important at the start of this development process to consider what the selection task should do, that is, what use or purpose the data obtained from this task might serve. The selection task was *first* designed by Wason (e.g., Wason, 1968, 1983; Wason & Johnson-Laird, 1972) to allow investigation of the processes that were involved in reasoning, when deciding whether given rules were true or false or whether specific objects or events conformed to a given rule. The task was at that time regarded as having practical significance, as it was believed to be a practical application of the hypothetico-deductive scientific hypothesis testing method, which was thought to be in common use in everyday life when using the ordinary conditional (e.g., Wason & Johnson-Laird, 1972). Data obtained from the selection task was thus intended to provide insight into what processes might be involved when we used these ordinary conditionals within our everyday lives. As discussed above, in the years since its inception, the selection task has been used predominantly to investigate the effects of content, context and perspective on reasoning and decision-making. The data obtained from the selection task has played a central role within debates about the nature of information processing, representation, and rationality, and in the turn away from the old logic models of process and representation, towards probabilistic, descriptive and pragmatic accounts of thinking (e.g., Elqayam, 2018; Evans, 2006; Evans & Ball, 2010; Frankish & Evans, 2009; Mercier, 2018; Mercier & Sperber, 2011; Oaksford & Chater, 1998; 2007; Stupple & Ball, 2014). The selection

task has thus played a central role in the development of our conceptualization and understanding of human thinking and behaviour.

The overarching goal of the current research was to investigate what effects emotion has on practical, deontic thinking, decision-making and behaviour within a realistic decision setting. Achievement of that goal required a robust research vehicle, in which the potentially confounding influences of other key influences on behaviour could be controlled. As there was no task available that could provide an adequate vehicle for this work, a task was developed for the programme. The task was not developed for use only within the studies reported here. It was also designed with future research in mind. The new selection tasks were therefore designed to allow further investigation of previous content, context and perspective effects on reasoning and decision-making, but to do so within one task. By bringing these factors together in a more ecologically valid model of realistic decision environments, the new tasks should allow investigation of the combined effects on selection patterns, of variables that had produced apparently isolated content or context effects in previous tasks. In so doing, the new tasks should permit a better understanding of *what* and *how* features of everyday decision environments might influence our thinking, decision-making and behaviour. If the experimental variables could be effectively controlled within one task, it was hoped that the selection patterns would show differences between conditions that were reflective of the differences between variables within those conditions. For example, anxiety might function to increase expectation or salience of rule-breaking behaviours, which might in turn be reflected in higher selection frequencies of cards that contain or might contain evidence of that behaviour. Whether or not anxiety has such effects, might depend upon the level of utility and or threat associated with the perceived consequences of different inferences or behaviours. Happiness might function to reduce expectation or salience of rule breaking behaviours, and or heighten expectation or salience of behaviours that show rule adherence, which might be reflected in higher selection of cards that contain or might contain those behaviours. Successful control of the key variables that are thought likely to influence selection patterns in the task, would allow greater confidence that any

observed differences in selection patterns between conditions could be understood, at least in part, as a product of the systematic variation in these variables between experimental research conditions. As Wason had originally intended when developing his task, data obtained from the new selection tasks should provide insight into what processes might be involved when we use ordinary conditionals within our everyday lives, in circumstances that are like those depicted within the new selection tasks.

This development of the new selection tasks is exploratory and experimental. The variables that are investigated within this research project have not previously been brought together and operationalized within one experimental task. Whether it would be possible to devise a selection task in which multiple variables could be adequately, and usefully, operationalized and controlled within and between experimental conditions, was not known. If this endeavour is successful, the achievement would be more than a greater understanding of how the investigated variables might function in interaction within the different experimental conditions. The new selection tasks represent an important development of method. They would provide a new way of investigating human thinking and decision-making, in which multiple variables could be controlled and explored, that could be adapted for use in wider decision-making contexts.

2.1.4. Summary

The aim of developing the new selection tasks was thus to construct a research vehicle that provided a robust, reliable stimulus to targeted emotional responses, that would allow the variables manipulated within them to be varied systematically. Additionally, what was intended was the construction of a task that could be adapted for use in different settings, which include ecologically valid decision contexts that approximate everyday decision contexts, that provides the foundation for a more convincing analogue of emotional reasoning and decision-making beyond the experimental setting. It should be possible to adapt the task for use in other decision contexts if needed in future research.

2.2. The New Selection Task: Identification of Initial Key Variables

The process of developing a new selection task was thus systematic, and exploratory. From the literature search of previous published investigations with the selection task, and during the process of constructing new selection tasks, twenty key factors were identified that might reasonably be expected to influence participant selection behaviours in the new tasks (see Table 1 for a summary of these factors). These factors are not independent in nature. They are important aspects of an ecologically valid selection task, which is designed to simulate plausible, decision setting in which pragmatic everyday agreements are made. Although these factors overlap, the labelling and consideration of them as separate entities permits a more detailed specification of the nature of the variables that are likely to influence participant behaviour in these new tasks.

2.2.1 Plausibility, Realism, Familiarity, and Ecological Validity

Realism and familiarity have been identified as influencing participant behaviour in previous versions of the selection task. Participant responses differed significantly between the first versions of Wason's (1968) selection task and the later thematic versions of this task. It has been argued (e.g., Cox & Griggs, 1982; Gigerenzer & Hug, 1992; Johnson-Laird & Legrenzi, 1972; Manktelow & Evans, 1979; Pollard & Evans, 1987; Wason, 1983) that one of the most important differences[5] between the original versions of Wason's (1968) selection task and later thematic versions of this task, was the use of arbitrary, abstract rule content in the former and meaningful, realistic, familiar rule content and contexts in the later. This difference was thought to result in the different selection frequencies between the old and

5 The difference in form (i.e., thinking about the theoretical, truth status of beliefs *vs.* deontic, practical actions, thinking about what one should do) between the conditional rules used in abstract *vs*. thematic versions of the selection task is not discussed here, although this difference seems likely to have an important effect on participants' understanding of and response to these versions of the selection task (e.g., Manktelow & Over, 1995).

Table 1. Summary of the first variables used to guide development of opening scenarios, ground rules and card arrays for the new selection tasks.

Variables	Summary Description/ Relevance
Plausibility, Realism	Of rule and context in which rule is situated
Familiarity	Familiar situation in which checking for rule breaking might occur. Experience of events, scenario, social contracts, provides meaning, coherence, that may not be available with unfamiliar content
Ecological Validity	Decision contexts and rules that represent everyday experiences of task participants
Mundanity	Everyday events, objects, behaviours, experience
Congruence	Between rule context, content, and rule components
Connection Between *p, q*	Familiar, meaningful, not arbitrary or inconsistent with, or not necessarily part of the experienced world
The Conditional	Deontic Content, perspective and development
Emotion-as-Content	Materials should be effective stimuli to *emotion-as-content* conditions (i.e., *anxiety*, *happiness*, *neutral*).
Natural Spoken Language	Everyday written social communication or spoken conversation within participant experience
Narrative Episodes	Establish a meaningful, coherent relationship between rule context, content and card array items
Relevance to Self	Function as *stimuli to* emotional *response*, stimuli must be of personal relevance to participants
Self and Other	Inclusion in scenario, rule and card array, allow testing of perspective effects, via shift where cost-benefit situated
Goals	Central role in emotion, and motivation for behaviour
Heavy Cuing	Expectation of rule violation or cheating, cued within context and instructions
Deontic task and conditional	Format selected for tasks, practical action, everyday conditionals, pragmatic social agreements
Social Contracts	Everyday interpersonal scenarios that could plausibly, naturally contain social contracts, social-relational setting, suitable stimuli to emotion
Cheater Detection Instructions	Look for cheater, rue breaker or rule violation instructions, common feature of the deontic selection task
Omit Negations	Avoid confounding by using within one scenario
Generalise Across Participants	Variables need to function similarly across participants

new tasks. Participants often selected a higher number of cards that could falsify the given rule when they were presented with the more familiar, everyday rule content and scenarios in the later tasks. The use of thematic content that is not familiar to participants in a selection task, has resulted in task responses that are similar to those observed when participants have been presented with 'abstract' content. In a typical abstract version of the task, for example, participants were presented with a rule, which applied, they were told, to a given pack of cards. In Wason and Shapiro (1971), experiment one, the rule was either '*Every card which has a vowel on one side has an even number on the other side*' or *'Every card which has a D on one side has a 3 on the other side*'. This kind of content, within rules that were unlikely to be familiar or meaningful to task participants, was typical of the first selection tasks. In many of the later task versions, researchers often devised rules and contexts that were likely to be regarded as being more familiar, plausible and/ or realistic by participants in those tasks. Rule content and contexts need not have been directly experienced by participants, for them to be classified as being familiar (e.g., Cheng & Holyoak, 1985). Rules and scenarios were often drawn from events or objects that participants might have encountered before the task, within their everyday experiences, via the encounters of others, or within a more virtual medium such as film or novels. Via any of these means, participants might have experienced situations that were like those presented to them in the selection task before completing the task, and thus have some memory of events that are like those presented in the task. However, the experience had been obtained, having or not having prior experience of similar situations and events, was thought to affect participant behaviour in the selection task. The reason for this change in behaviour might have been the activation of the mental representation of that prior experience, when participants encountered a similar occasion in the task. If participants were asked to look for evidence of cheating, rule breaking, or rule-adherence within the task, their memory of similar circumstances may help them to identify information that will allow them to do that more easily (e.g., Cheng & Holyoak, 1985; Griggs & Cox, 1982; Johnson-Laird, Legrenzi & Legrenzi, 1979;

Manktelow & Over, 1991). Without that prior experience, participants have fewer cues to direct their behaviour within the task.

The degree to which the terms *realistic, plausible* or *familiar* can be accurately applied to previous thematic versions of the selection task, varies between tasks and study participants. Thematic versions such as the legal drinking age rule (e.g., Griggs & Cox, 1982; 1983; Wason & Green, 1984), the modes of transport problem (e.g., Cosmides, 1989; Griggs & Cox, 1983; Manktelow & Evans, 1979; Wason & Shapiro, experiment 2, 1971), the use of stamps on letters (Johnson-Laird, Legrenzi & Legrenzi, 1972), and voting rules (e.g., Valina, Seone, Ferraces & Martin, 2000) seem likely to have been regarded as being realistic, plausible and familiar scenarios and rule contents by participants who were presented with them in those tasks (see Table 2 for examples of these contexts and rules).

Claims that other versions of the selection task presented participants with realistic, plausible or familiar content are less convincing (for examples, see Table 3). The content used in some task versions would require most if not all participants to look beyond their everyday existence for experiences that would make the rules and scenarios seem familiar, realistic or plausible. Although, participants might be able to bring such scenarios to mind, through past experiences with similar content in novels, films, documentaries or other dramas, it seems unlikely that scenarios such as those presented in Table 3, present participants with content that models realistic, plausible or familiar events. In the Virgin Mothers task (Sperber, Cara & Girotto, 1995), for example, participants are asked to imagine themselves as investigative journalists who are searching through medical records to find out whether young women, who belong to a sect, had been artificially inseminated by the leader of that sect. The goal of this search was to find out whether the following rule is true: '*If a woman has a child, then she has had sex*'. Although the content might be accurately classified as being realistic, albeit a little unusual, the proposal and practice of testing such a rule is highly unusual. Similarly, in the pancakes for lunch version (Thompson, Plowright, Atance & Caza, 2015), the role of detective assigned to participants so that they can discover whether pancakes are made by

Table 2. Examples of realistic, plausible, familiar rule content and contexts used in previous selection tasks.

Publication	Task Section	Content
Wason & Shapiro (1971)	Scenario	Train and car journeys taken by experimenter
	Rule	Every time I go to Manchester, I travel by car
Manktelow & Evans (1979)	Scenario	Rules describe relationship between food and drink experimenter consumed on different days
	Rule	If I eat haddock, then I drink gin
Johnson-Laird, Legrenzi & Legrenzi (1972)	Scenario	Imagine you are a post-office worker sorting letters, find out whether envelopes violate the rule
	Rule	If a letter is sealed, then it has a 50 lire stamp on it
Griggs & Cox (1983)	Scenario	Imagine you are a policeman, need to make sure that people are not breaking the drinking age rule
	Rule	If a person is drinking beer, then the person must be over 19 years of age
Cheng & Holyoak (1985)	Scenario	You are an immigration officer at an airport. You have to check Form H for listed inoculations against diseases, to ensure that entering passengers are protected from the disease
	Rule	If the form says 'ENTERING' on one side, then the other side indicates cholera among the list of diseases
Cosmides (1989)	Scenario	You supervise 4 women at the local Board of Education, who assign students to the right school district. Rumours that these women are cheating, assigning their own children to the best school. You must find out if the rumours are true.
	Rule	If a student is to be assigned to Grover High School, then the student must live in Grover City.
Manktelow & Over (1991)	Scenario	Mother wants her child to tidy their room, the child wants to go out to play, the mother sets the rule to get the child to tidy their room
	Rule	If you tidy your room, then you may go out to play
Gigerenzer & Hug (1992)	Scenario	Factory wants to motivate employees to work on weekends, management sets the rule. Have heard rumours of workers violating this rule
	Rule	If an employee works on the weekend, then that person gets a day off during the week

Table 3. Examples of less convincing realistic, familiar rule content and contexts used within previous selection tasks.

Publication	Task Section	Content
Gigerenzer & Hug (1992)	Scenario	The overnight rule for staying in a cabin when hiking in the Swiss Alps. Cold in the cabin, hikers must carry their share of wood. Rumours that this rule is not always followed. Imagine you are a guard, checking whether hikers have violated the rule
	Rule	If someone stays overnight in the cabin, then that person must bring along a bundle of wood from the valley
Cosmides (1989)	Scenario	Your new job for the city of Cambridge involves studying the demographics of transportation. You produced a report on Cambridge residents which states, find out whether people violate this rule
	Rule	If a person goes to Boston, then he takes the subway
Sperber, Cara & Girotto (1995)	Scenario	Leader of a Californian sect has been accused of having some of the sect's virgin girls artificially inseminated, to create virgin mothers. You are a journalist, examining the medical records of these girls, attempting to find out if the usual explanation for pregnancy is true.
	Rule	If a woman has a child, then she has had sex
Thompson, Plowright, Atance & Caza (2015)	Scenario	A day-care centre, everyone loves pancakes, the children particularly. The cook is disorganized but has promised to try to follow the rule. The cook is forgetful. Your job as a detective is to find out when the rule is broken
	Rule	If it is the first day of the month, then there must be pancakes for lunch

the cook on a given day within a day-care centre, seems a little farcical. The role of detective is presented to participants with no rationale for how they came to occupy such a role within a child day-care centre. These points are not trivial. It has been demonstrated robustly in many previous reasoning tasks that task behaviour is influenced by perceived plausibility and participant beliefs (e.g., Cheng, Holyoak, Nisbett & Oliver, 1986; Evans, 1989; 2017; Hahn & Harris, 2014; Kassin, 1979; Lord,

Ross & Leper, 1979; Newstead Allen & Pollard, 1993; Wason, 1983). Participants have been shown to be more willing to accept information that is consistent with or confirms their beliefs, and more likely to refute or discount task content that contradicts their beliefs. It seems possible that participant responses in less realistic scenarios was influenced by belief bias. As this the influence of beliefs on behaviour was not the focus of study in those investigations, the possible influences of this on task responses were presumably not considered.

Although there have been frequent discussions of the importance of familiarity and realism within task materials, evidence that any measure of familiarity with or realism of task materials was obtained from study participants, has been presented in very few published studies of the selection task (for exceptions, see Gigerenzer & Hug, 1992; Griggs, 1984).

2.2.2. Plausibility, Familiarity, Availability and Belief.

At any one moment, a small amount of information that we have stored or represented within our brain is more available, often as a result of being cued by the context in which we are situated (e.g., Hebb, 1949; Tulving & Pearlstone, 1966). If I say ‘ *bacon*’ for example, you might instantly think of eggs, or animal cruelty, or a sandwich that you ate this morning, because those pieces of information are most strongly tied to the word bacon at that moment in time, as a result of a strong learned associative link between objects, your beliefs, or a recent experience. We have the capacity to process only a small amount of information at any one time, and our store of memories are not equally available at any one time (e.g., Marois & Ivanoff, 2005). The availability of content that has been presented within the card array within previous selection tasks (i.e., *p*, *not-p*, *q* or *not-q*), has been said to influence card selection frequencies (e.g., Evans, 1999; 2002; Pollard, 1982; Pollard & Evans, 1987; Thompson, Evans, & Campbell, 2013); content within the outcomes that are most available to us within the task (e.g., *p*, *p* and *q*, or *p not-q*), will be selected more frequently. Their availability might be influenced by our experiences before encountering the selection task, or the way in which content is presented within the task.

Memory cuing, or availability, has been one of the most favoured explanations of the effect of content on reasoning within the selection task, providing both an explanation for facilitation and the absence of this effect (e.g., Griggs & Cox, 1983; Johnson-Laird, Legrenzi, & Legrenzi, 1972; Pollard, 1981). Drawing on the *availability heuristic* (e.g., Tversky & Kahneman, 1973), and on associationist work such as connectionist neural networks (e.g., McCulloch & Pitts, 1943; Rumelhart & McClelland, 1986) and Hebb's (e.g., 1949) work on learned associations, availability theories have attributed the apparent effects of content on card selection frequencies to the amount of prior experience a participant has had with task content (e.g., Gigerenzer & Hug, 1992; Johnson-Laird, 1982; Manktelow & Evans, 1979; Pollard, 1982; Wason, 1983). Card selection might thus be directed by participant familiarity with the content of a given rule. According to this view, experience of similar content has created associations between the propositions in a similar conditional rule. The more frequent the pairing of antecedent (*p*) and consequent (*q*) in a participant's experience, the stronger will be the association between them, and the greater the ease with which *q* will come to mind when they are presented with *p*. *Q* will thus be the most available response unless participants have experiences that provide possible alternatives to *p* or *q* (e.g., Johnson-Laird, 1982; Manktelow & Evans, 1979; Pollard, 1982; Wason, 1983). Selection task performance in previous tasks may have been 'facilitated' when participants have been able to recall experience with the content of a rule, with the relationship expressed within the rule between antecedent and consequent, and with counter-examples to the rule governing the given relationship (e.g., Griggs & Cox, 1982; Pollard & Evans, 1987). If participants have prior experience of looking for counter examples to similar rules, or of looking for counter-examples to check for rule adherence or rule breaking, they are more likely to look for that evidence when presented with the selection task.

It has been argued that prior experiences provide heuristics, or automated, shorthand rules of thumb that we use when solving problems, evaluating arguments or making decisions (e.g., Pollard, 1982; Tversky & Kahneman, 1974). Knowledge or beliefs obtained in previous experiences are often used to determine

which path to take. Features of the decision environment seem to trigger recall of or draw attention to solutions that are perceived to have worked effectively in the past (e.g., Bar-Hillel, 1980). It is not clear whether recall of one falsifying instance of the relationship described within the task conditional would be sufficient to cue selection of *p* and ¬*q* (Griggs & Cox, 1982; 1983), or whether *p* and ¬*q* should be more available than *p* and *q* (e.g., Pollard, 1982) to result in a higher selection of *p* ¬*q* in the selection task. It seems likely that this will depend upon other features of the decision environment.

2.2.3. Congruence Between Rule Context, Content, and Components.

Congruence between the opening scenario or task context, the rule (i.e., *if p, then q*) and rule components (*p*, and *q*) has been identified as an important feature of previous versions of the selection task in which the facilitation effect was achieved (e.g., Almor & Sloman, 2000; Manktelow & Evans, 1979; Pollard, 1981; 1982; Pollard & Gubbins, 1982). Whether facilitation is sought or not, congruence or lack of congruence between rule context, rule and rule components has been shown to alter selection task behaviour. Participant selection of the *p* and *not-q* cards is not the sole desired outcome of the new selection task; selection patterns that differ between experimental conditions should tell us more about how different factors influence behaviour, decision-making and thought. Either congruence or lack of congruence between these aspects of the task, therefore, might be modelled within the new selection tasks. Both scenarios could be envisaged within participants' everyday experiences, and so could provide suitable decision contexts for the task. The presence of competing goals might create a context in which incongruence could plausibly be introduced within a decision context. For example, you have spent a long day at work and are looking forward to going home alone and getting an early night. You are tired. This could set the rule context. Going home alone and early to bed have been positioned as the desired events for this evening. Here we could introduce an additional demand on your time - you had agreed (some time ago) to have a friend over for dinner this evening, but you had forgotten all about it when you planned your early night. You and the friend had agreed to the following

ground rule for the occasion – *if you cook dinner, they will bring wine*. This shift creates incongruence between the initial rule context and the rule.

Without additional detail, it is not clear how the change in plans for the evening has been regarded by the agent who was hoping for an early night. The change might have positioned both the antecedent (you cook dinner) and consequent (friend brings wine) as costs to the host, as both interfere with the goals of going home alone and getting an early night. Reluctance to cook dinner might be far more salient than any concern about whether the friend brings wine. Alternatively, dinner with the friend this evening might be a welcomed event. This uncertainty about the subjective utility of rule components and thus of the card array items, might influence task response in an unsystematic manner, making selection patterns hard to interpret, if utility influences card selection, which it might (see also sections 2.2.12 *goals*, 2.2.7 *emotion* and 2.2.10 *relevance for self* within this chapter). It would be possible to introduce incongruence a little differently to the above example. You might encounter a friend as you leave work, and stop for a chat, during which you come to the same agreement for dinner at your house this evening.

It has been argued that participants evaluate the plausibility of behaviours presented in rule contexts, rule components and card array outcomes, rather than the logical validity of presented possible conclusions in the selection task, and that this evaluation influences task selection (e.g., Bucci, 1978; Evans, 1989; 2017; Manktelow & Over, 1993). A lack of congruence between task components might therefore influence task response via belief bias. Without a better understanding of participant interpretation of the scenario, it would be difficult to interpret card selection patterns for tasks in which there is obvious incongruity between rule context and content. The change in focus within this example seems to introduce competing goals, which might change the subjective utilities of a past agreement and perhaps alter the utility of plans that were made earlier that day for the evening (e.g., Manktelow & Over, 1991; Over & Manktelow, 1993). The task thus becomes more complex. The degree of incongruity could be manipulated by the insertion of rules or agreements that had a more or less obvious association with

the preceding context. Replacing the example rule above with the following, 'if you collect the bags, they will get the tickets', for example, would create a much higher degree of incongruity between the rule context and rule. Both contain familiar, plausible, realistic content, but in the later example it is not obvious how the context and rule fit together.

The presence of competing goals or contradictory behaviours might be perceived as plausible, realistic or familiar aspects of an everyday social setting. However, lack of congruence between a pragmatic agreement or social contract and the social setting in which they operate, might cause participant confusion, or position goals within the decision context so that they undermine the willingness or enthusiasm to honour a pragmatic agreement or social contract in that setting. Nevertheless, in the future, it may be possible to develop a scenario of this kind into a useful selection task. Convincing examples of incongruent rule components seem more difficult to achieve within plausible, realistic versions of the selection tasks (see section 2.2.4. for consideration of this issue). What this discussion demonstrates, is that realism, plausibility and familiarity must be thought about and operationalised carefully when positioning familiar, realistic details in task materials.

2.2.4. Meaningfulness of the Relationship between *P* and *Q*.

Another factor that is thought to have produced significant differences in card selection frequencies between previous versions of the selection task, is the meaningfulness of the relationship between rule components (i.e., *p* and *q*). The relationship between antecedent and consequent, it has been argued, has been more meaningful in many of the thematic task versions than they were in the earlier abstract tasks, because the thematic rules contained content that participants were likely to have experienced prior to the selection task. This experience might also have made the task seem more meaningful, as participants may have made sense of the task in relation to their experience of similar rules (e.g., Manktelow & Evans, 1979; Wason & Shapiro, 1971). The importance of this factor was highlighted in the publication of a series of selection task studies (Manktelow & Evans, 1979), in which participants were presented with rules that

defined what the experimenter ate and drank at specific meals (e.g., '*If I eat haddock, then I drink gin', If I do not eat pork, then I drink red wine', If I eat macaroni, then I do not drink champagne')*. Selection patterns in these tasks mirrored those that had been observed in earlier, abstract task versions. Although the rule context and content in this series seemed to contain realistic and familiar content, the association between antecedent (*p*) and consequent (*q*) had no established tradition or meaning beyond that which was presented to participants within the task (e.g., Bracewell & Hidi, 1974; Gigerenzer & Hug, 1992; Lunzer et al.,1972; Manktelow & Evans, 1979; Pollard, 1992).

Manktelow and Evans (1979) expected that the act of selecting drinks based on what was eaten at a meal would be familiar to participants, however, the association for participants between what the experimenter ate and drank at a given meal, seemed to be as arbitrary as the association between specific letters and numbers in the earlier selection tasks. The food and drink rules thus may have functioned in a similar manner to the rules that were presented in the abstract tasks, in which the experimenter informed participants that a given rule referred to a pack of cards.

Participants probably had prior experience of playing cards, which were very like the cards referred to by the rules in the earlier abstract tasks. Participants also had a great deal of experience of the numbers and letters that were used within the abstract task rules. Abstract task content was thus familiar and realistic. Participants were perhaps not familiar, however, with rules that claimed there to be a specific association between the placing of numbers and letters on either side of each of the cards within a given set. In contrast, the conditionals used in many other thematic versions of the selection task, more closely modelled participants' prior experience of specific relationships between *p* and *q* pairs that have been used within ordinary conditionals.

The scenarios provided within many of the thematic task versions, tended to model familiar, plausible, realistic and meaningful relationships between *p* and *q* pairs (e.g., *If an employee works on the weekend, then that person gets a day off during the week*, Gigerenzer & Hug, 1992). In these circumstances, it was perhaps much easier for participants to conclude *q* when presented with *p*, and to understand the

relevance of *not q* within these more familiar versions. It has been argued, that in the absence of a meaningful connection between *p* and *q*, it may be more difficult for participants to think of contradictions to these rules (Manktelow & Over, 1991; Pollard, 1981, 1982). It might not be clear to participants that given rules apply across situations if they seem to be arbitrary (e.g., Manktelow & Over, 1991). It is also possible that, given a lack of meaning, participants might fail to understand the exclusivity of a rule; they might imagine that another rule might just as easily apply in the situation described (e.g., Manktelow & Over, 1991). In such circumstances, content that has been included within the card array to represent $\neg q$, may not be seen as *being* $\neg q$ by participants. The lack of any meaningful connection between antecedent and consequent within a conditional rule, perhaps undermines the realism, familiarity or plausibility of that rule. Meaningfulness of the rule is not independent from the issues of realism, plausibility, familiarity and availability, that are discussed above. However, focus on this aspect of the task provides more detailed guidance on what the realization of these factors entails.

2.2.5. Everyday Mundanity

Relevance to the everyday, mundane decision-making experiences of participants has been identified as being a key feature of the facilitation effect (e.g., Griggs & Cox, 1983; Pollard, 1981). When participants were presented with contexts and rules that modelled familiar experiences, they used those experiences to decide what they should do in the selection task. Within those familiar experiences, they had looked for evidence of rule breaking or heard accounts of how other people had done so, and they applied this practical knowledge to the task. As this factor seems to have influenced participant responses in the selection task, it was important to control for possible effects of this variable within the new tasks. Beyond this consideration, as one of the aims of this project was to construct a selection task that would allow investigation of everyday decision-making, it was essential that the new tasks simulated everyday social contracts and settings in which these might occur. As they are an integral part of these, it also seemed essential that the occupations and behaviours represented in these materials were examples of those that might be encountered in participants' everyday

experiences. Some of the occupations presented in previous versions of the selection task have been more exceptional, improbable, or unfamiliar[7].

2.2.6. The Conditional

The conditional rules that have been used in previous versions of the selection task have differed in nature (e.g., Over & Manktelow, 1993). Within the first tasks (e.g., Evans & Wason, 1976; Wason, 1968; 1969; Wason & Johnson-Laird, 1972), the conditional rules often described the occurrence of letter-number pairs on each of the cards within presented sets of cards, such as *if there is a D on one side of the card, then there is a 3 on the other side of the card* (Evans & Wason, 1976). In most instances, participants were asked to determine whether the rule was true or false. In some studies, they were asked to determine whether the cards presented to them conformed to the given rule. In many later, thematic versions of the task, the rules were presented as deontic conditionals. These deontic conditional rules could not be proven to be false; they were created to regulate, guide or govern human behaviour (e.g., Manktelow & Over, 1991; Over & Manktelow, 1993). The participants' task in these instances, was to determine whether the rule had been adhered to, broken, or violated.

Deontic thinking concerns what we should do and should not do. These are pragmatic, and context-sensitive issues. Cheng and Holyoak (1985) argued that many deontic conditional rules took the form of permissions, in which a regulation between an action and precondition for that action was defined. These were formulated as follows – *if the precondition is satisfied, the action may be taken*, or, *if the action is to be taken, the precondition must be satisfied*. This form is demonstrated by the drinking age rule (*If a person is drinking beer, then the person must be over 19 years of age*, Griggs & Cox, 1983). Not all deontic rules contained these notions of obligation and entitlement (e.g., Gigerenzer & Hug, 1992).

[7] Given the variety of human experience, it might not be possible to create stimuli that would be mundane, realistic and or familiar for all participant, despite best efforts to do so. This possibility should be considered when interpreting data.

Two publications of research studies that had used the selection task to investigate deontic reasoning and decision-making, represented a significant development in the use to which this task could be put. In the work discussed below, these authors demonstrated the possibility of situating two parties within the rule and array, in a mundane, everyday social exchange of benefit and cost. According to Manktelow and Over (1991), deontic reasoning and decision-making within the selection task, and in everyday situations, is influenced by the subjective utility of available behaviours within a given setting: by which actions are preferred by a specific person within that setting. In discussing the nature of regulations, rules, and laws, Manktelow & Over (1991) introduced a distinction between the social roles of *agent* and *actor* that had not been considered within previous task versions. The agent is responsible for introducing or asserting a rule, which functions to guide the behaviour of the actor. This distinction introduced possible differences in their subjective utilities in relation to rules or regulations. Their introduction of these perspectives into the selection task, through a conditional permission statement that was made by a mother to her son, altered participant selection patterns significantly. In their first experiment, the opening context presents a mother who wants her son to tidy his room; the son wants to go outside to play and would prefer not to tidy his room. The mother tells her son '*if you tidy your room, then you may go out to play*'. The son is thus required to tidy his room before he is allowed to go out to play. If the mother does not allow her son to go out to play after tidying his room, she would have broken the agreement. If the son goes out to play without tidying his room, he would have disobeyed the rule. By asking participants to adopt either the role of the mother (who doubts that her son will tidy his room), a neighbour (who has been asked to keep an eye on the son), or the son (who thinks that his mother might break the agreement) in this experiment, Manktelow and Over (1991) demonstrated that participants could look for evidence of rule breaking by more than one party within the card array.

Perspective effects were also investigated by Gigerenzer and Hug (1992), who also highlighted the different roles of the two parties involved in a social contract (those who set the rule, and those who were subject to the rule). Previous versions of the

selection task, by including only one party within the rule and array, had provided scope only for unilateral cheating options. Only one party was depicted within the conditional rule and array, and participants' task was to discover whether the behaviour of that party violated the given rule. By including the two parties within the rule context, and providing bilateral cheating options, Gigerenzer and Hug (1992) made it possible to look for evidence of rule violation by both parties within the card array, and in so doing they altered participants behaviour in this task.

The change in design that was reported within these two publications, demonstrated that the selection task could be used to investigate everyday pragmatic social contracts, or agreements, and that it was possible to create greater variance in selection patterns that was determined by the perspective that participants had been asked to adopt (see also, Beller & Spada, 2003, for a subsequent investigation of perspective effects). In previous versions of the thematic selection task, the rule content positioned one party within both the antecedent and consequent (examples of these can be seen in Tables 2 and 3). Within the rule used in one of the studies reported by Manktelow and Over (experiment 2, 1991), one party was positioned within the antecedent (the son, actor), and another party (the mother, agent) was clearly positioned in the consequent position: *if you tidy your room, then I will let you go out to play*. Although the actions of another might have been inferred from the behaviour described in the consequent within some versions of previous selection tasks, failure to clearly depict a second party in that position in those instances, left room for other explanations for behaviours that might have provided evidence of rule breaking, which might create uncertainty as to whether that behaviour provided evidence of rule breaking. This point has not been discussed in previous discussions of this task. In Gigerenzer and Hug (1992), for example, participants were given the following rule: *If an employee works on the weekend, then that person gets a day off during the week*. Participants cued into the employee's perspective were told that weekend working benefitted the employer, by allowing them to make better use of their machines. Working during the weekend was presented as a cost to the employee. The information presented in the card array for this rule was *worked on*

the weekend (*p*), *did not work on the weekend* (*not*-p), *did get a day off* (*q*), *did not get a day off* (*not-q*). It is not clear that *not-q* in this example necessarily represents *not-q*, because of the absence of *during the week* on the card presented as the not-q outcome. It is also not necessarily the case that the failure to get a day off in the case of not-q was caused by the employer breaking their agreement. Failure to clearly represent the employer in this outcome, leaves room for other explanations for that occurrence, such as the employee deciding to work overtime. What this example demonstrate, is the need to consider these factors when designing a new selection task. If the behaviour of two parties is represented within the selection task rule, it seems important to ensure that the card array items clearly depict the behaviour of those two parties in relation to the given rule. These examples were used to guide the construction of rules that were developed within this project.

2.2.7. Emotion as Content

2.2.7.1. Evoking Emotions

As the materials were to function as emotion induction conditions within the new tasks, for emotion as a within-task variable, it was important to ensure that the content of each condition contained behaviours, objects and events that would be likely to arouse the targeted emotions in task participants. Emotions thus require eliciting conditions; the occurrence of events, objects or behaviours which act as stimuli to their response. For example, although not sufficient, realism has been identified as being an important and necessary condition for the arousal of emotion (e.g., Frijda, 1986; 2009; Lambie & Marcel, 2002; Oatley & Johnson-Laird, 1987; Oatley, 2002; Ortony, Clore & Collins, 1988). Emotions are elicited by objects, ideas, or events that are perceived to be real, whether they are 'real' or not (e.g., Frijda, 1986; Ortony, Clore & Collins, 1988). The development of materials as effective stimuli to the targeted emotional responses is covered in greater detail in chapters four and five.

The labelling of emotions requires a little consideration. Within ordinary language and previous research investigations, different terms have been used to represent what seem to be similar emotions (e.g., *tense*, *anxious*, *frightened*, *panicky*, or

scared, or *annoyed*, *angry*, *irritable*, *incensed* or *infuriated*). There have long been debates about whether these terms represent the same or different emotional states (e.g., James, 1890; Johnson-Laird & Oatley, 1989; Ortony, Clore & Collins, 1986; 1988; Ortony, Clore & Foss, 1987; Storm & Storm, 1987). In the light of the difficulties associated with identifying correspondence between emotion terms and the exact state that is referred to when those words are used, a cluster approach was adopted within the current research to the labelling of emotions, and several words were therefore used to identify the investigated emotions.

2.2.7.1.3. A Neutral Emotion-as-Content Condition

In order to observe the effects of happiness and anxiety on card selection patterns in the new selection tasks, it seemed necessary to include a *neutral* emotion-as-content condition. The desired effect of the materials developed for this condition, would be that they evoked no emotional response in participants who were completing this task version. Card selection patterns that were obtained from *happy* and *anxious emotion-as-content* conditions, could then be compared against selection patterns in the neutral *emotion-as-content* condition, to provide a context in which to interpret participant behaviour. A *no-emotion* content condition would also provide a counterpart to the *neutral* emotion-as-background state condition that would be included in the emotion induction groups; these two conditions would provide a similar control for the possible effects on task performance, of emotions that are present before participants encounter the new selection tasks, and emotions evoked by scenarios within the task.

Emotions have been conceptualized as being dynamic, multifactorial responses to objects, ideas, agents, or events that might affect or have affected us in some way that we value, care about, or regard as being important (Frijda, 1986; Ortony, Clore, & Collins, 1988; Scherer, 1988; 2005; Reisenzein & Hofmann, 1990). Scenarios constructed for the neutral conditions should therefore neither threaten nor show the realization of valued goals, or present appetitive or repulsive stimuli. As emotions might be evoked by high levels of uncertainty, or by the behaviour of others that was appraised as being unfair, blameworthy, or ridiculous it also

seemed important to exclude such factors in this condition (e.g., Epstein, 1973; Frijda, 1986; Greenspan, 2004; Izard, 1977; Ortony et al., 1988; Smith & Lazarus, 1993). The content developed for the no-emotion content, would need to be perceived to be of little personal or real importance by task participants. An obvious strategy that might be used to develop materials that evoked no emotion, would be to reduce the perceived realism of the scenarios, conditionals and subsequent behaviours depicted within the card array items. However, for the neutral content condition to function as a robust control for the effects of happiness and anxiety on task performance, *all* other factors that have been identified and controlled within this research project would need to be held as constant as possible across all conditions. As discussed above, realism is thought to have altered participant behaviour in previous versions of the selection task. Reducing realism in the neutral condition would make it impossible to determine whether this factor, rather than the difference in emotion between conditions, was the cause of any differences or lack of differences in card selection patterns between conditions.

One of the challenges faced in the construction of the *emotion-as-content* conditions, was the need to include a social contract cost-benefit distribution within the conditional agreement (e.g., Cosmides, 1989; Gigerenzer & Hug, 1992), at least in the first versions of the new selection tasks (the social contract, cost-benefit distribution is discussed in section 2.2.15). Within the conditional agreement, two parties would agree to do something that involved a cost to each of them but provided a benefit for the other party, in order to obtain a benefit themselves. The conditionals used in the new tasks would be pragmatic, everyday social agreements (these were discussed in section 2.2.6). Within these parameters, it would be necessary to construct neutral content scenarios in which participants would care sufficiently about one party not behaving as they had agreed to, without that evoking an emotional response. Participants would have to care a little about the agreement, for the costs and benefits to function as real costs and benefits and the behaviours post agreement to then matter, but not care too much. Within the *happy* and *anxious* content conditions, the cost-benefit content might need to be of greater perceived value for the *happy* and *anxious* conditions to successfully evoke

those emotions. The value of costs and benefits within the conditionals might therefore differ between the happy, anxious and neutral content conditions. It might not be possible to separate costs and benefits from emotion within these task versions.

It is possible to consider costs and benefits in a dispassionate manner. However, when the costs and benefits are costs and benefits to you, and you are in an emotional state when assessing them, the simulation of which is being attempted with these new tasks, emotion and personal utility are entwined. Emotions are about costs and benefits (e.g., Arnold, 1960; Darwin, 1872, Frijda, 1986; Ortony, Clore, & Collins, 1988; Scherer, 1988; Reisenzein & Hofmann, 1990). Emotions evoked within-task could be about the agreement and, or, not about the agreement. It would be possible to evoke emotions within the selection task that were not directly associated with the agreements. If that was attempted, it would be necessary to consider possible conflicts between the costs and benefits that were present within and between emotion as content conditions, when interpreting card selection patterns. Emotions are influenced by context (e.g., Frijda, 1986). If, for example, an event that brought great happiness (e.g., a new, much wanted car that would allow you to travel much more easily and safely) was presented before an unrelated agreement that, although pleasant, was of lesser perceived importance than the prior event (e.g., a friend promised to meet you this evening for drinks), failure to do as promised might be viewed differently than it would be in the absence of the prior event. Failure to keep the date might easily be perceived as being of less importance, it might be excused or diminished or not viewed as being a real failure to do as agreed, because of the greater perceived importance of the prior event. This complication was avoided within these first versions of the new selection task; in these, the intended stimuli to the targeted emotional responses in the *anxious* and *happy* content conditions, are the costs and benefits that will be represented within the conditional rules and card array items. The emotions elicited within-task are intended to be about the agreements that are depicted within the tasks.

To allow investigation of the possible influence of these factors on behaviour, the way in which they might be represented by participants was considered when developing materials for each of the *emotion-as-content* conditions within the new selection tasks.

2.2.7.1.4. Factors Influencing the Intensity of Emotions

It has been shown that emotions might influence thought and behaviour differently at different levels of intensity (e.g., Richards et al., 2914). What intensity of emotions were investigated in previous research studies with the selection task, has not been considered in previous publications. And yet, it seems possible that the intensity of an emotion will influence how that emotion influences thought and behaviour, perhaps some behaviours are more probable if some intensity threshold is reached, for example, or we might expect some consequences to be associated with the duration of their effects (e.g., Sonnemans & Frijda, 1994). Neglect of this question is not surprising. It would be difficult to attempt to equate levels of anxiety or happiness, or anger, across studies. It seems likely, however, that the effects of emotions investigated in previous experimental studies with non-clinical populations, were mainly the effects of mild and occasionally moderate emotions. Although the experiment is a real event, it is difficult to create a task that might seem to present real costs and benefits to participants, beyond the function of early attentional biases for possible threats.[8]

2.2.8. Natural Language and Narrative

The style of writing that was used within task materials is not something that has been discussed in published versions of the selection task. However, the necessity of including this factor in the design and development of task materials was decided during the process of thinking through how the materials would be written. Given the goals of creating effective stimuli to the targeted emotion responses, of minimizing the probability that the task itself or the way in which it was presented

[8] Intensity is considered further in chapter four, in which the construction of content for the new selection tasks is presented.

would evoke other, unwanted emotions in participants (e.g., the instructions, or some other aspect of the experimental procedure), of creating task materials that might simulate realistic, familiar pragmatic agreements that would generalize across participants and seem relevant to their concerns (these two factors are considered below in sections 2.2.11, and 2.2.17), the words used to present the decision contexts to participants must be an important consideration (e.g., Austin, 1962; Bruner, 1986; Grice, 1975; Oakley, 1999; Stalnaker, 1970). If the materials were to simulate everyday experiences and allow participants to imagine that they were within familiar settings, the avoidance of including anything within the materials that might remind participants that they were in a formal research setting seemed essential (e.g., Bruner, 1986; Grice, 1975; Oatley, 1999; 2002; Searle, 1969; Stalnaker, 1970; 1973; 1999). The narrative used within the opening context, conditional agreement and card array items for the new selection tasks should, ideally, elicit a sense of being in the situation described. It should direct attention from one moment to the next within the depicted unfolding events (e.g., Bruner, 1986; Oatley, 1999), and simulate a sense of unfolding over time, so that participants can more easily imagine themselves within the setting described (e.g., Parkinson & Manstead; 1993). More than this, the language used must evoke a sense of reality for the participants. The narrative needs to be representative of *their* everyday, social contexts, and include the kind of thoughts, sensations, and conversations that they have had or might have in those settings. Any elements that participants perceive to be odd, unfamiliar or unrealistic, will get in the way of their being able to imagine themselves within the situations described within the new selection tasks. We might encounter things within our everyday worlds that seem odd. We might adopt a more reserved stance in many everyday settings and approach many tasks in a detached mode. However, it would be difficult to evoke emotion in participants who approach the task from that stance (e.g., Frijda, 2005; 2009).

The popular use of more formal descriptions of decision contexts, which were written from third person perspectives, might have served to distance participants from the scenarios that they were asked to imagine themselves within whilst

completing previous versions of the selection task (e.g., Frijda, 2005; 2009; Lambie & Marcel, 2002; Nook, Schleider, & Somerville, 2017; Oatley, 1999; Pennebaker, Mehl, & Niederhoffer, 2003). It may have been difficult for participants to *imagine themselves within* those scenarios during the task, except perhaps in an abstract, distanced, hypothetical[9] sense. Although we might make many everyday decisions from such a detached position, it was important to control this aspect of the decision environment to increase the effectiveness of the *emotion-as-content* conditions as stimuli to happiness and anxiety. The arousal of emotion occurs when something that one cares about is either realized or seen to be at stake, and It is more difficult to evoke emotions from a position of distance from events. It was hoped that use of more natural language[10] and a realistic narrative within the new versions of the task, would more closely model realistic, everyday decision contexts beyond the research setting in which emotional responses might occur. Furthermore, as different emotions seem to be evoked when the focus of concern is for another rather than oneself (e.g., De Leersnyder et al., 2018; Mesquita, 2001; Ortony et al., 1988), it seemed important to encourage the immersion of participants within the selection task. The realization of anxiety and happiness would be easier if participants imagined themselves as actors within the selection task scenarios, rather than as distant observers of hypothetical events that were happening to imaginary others.

2.2.9. A Narrative Episode

The rule context in previous versions of the selection task has been designed to provide a coherent, meaningful connection between the rule, and the context in

9 Although the conditional and task ask participants to engage in hypothetical thought, the act of distancing oneself from a decision, or from the consequences of that, offer a further sense in which actions might be thought of as being or seeming to be hypothetical (see, for example Frijda, 2005; 2009: Lambie & Marcel, 2002, for a discussion of second and third-order phenomenology).

10 The term natural language is used here to refer to a style of language use that imitates participants' use of language to think about or describe their experiences.

which it is said to function, and the subsequent card array items. This aspect of the selection task has not been investigated or discussed in previous discussions of this task; it seems to have been taken for granted that this should be so, that the rule context and rule should fit together in this manner. As the context has been used to provide participants with a meaningful explanation of where or how the conditional rule is used, and the card array items provide examples of objects or behaviours that relate to the rule, this coherence makes sense. Without the provision of a meaningful context in which the rule functions and is presented for consideration by them, participants might struggle to understand what is being asked of them within the task, and to look for meaning elsewhere (e.g., Austen, 1962; Grice, 1975; Searle, 1969).

Many of the first attempts to sketch a situation in which realistic, everyday pragmatic social agreements might occur, contained elements that were not related to the agreement. At that point in the development process, the construction of stimuli that would successfully evoke the desired emotional responses (i.e., anxiety, and happiness) was a major concern. In the process of attempting to create successful stimuli to happiness and anxiety, the opening scenarios were fleshed out with content that was intended to increase the probability of participants feeling happy or anxious when they read the scenario. The inclusion of content within the opening scenario that was not related to the rule content, created several difficulties. One of these has been mentioned in discussion of the construction of a neutral content condition (above). To achieve a realistic narrative that did not contain elements that seemed odd, or that might distract from immersion within the unfolding of events, it seemed necessary to provide a rational for behaviours or events. These explanations often implied goals that were being pursued by the characters portrayed in described events. The inclusion of events, objects, behaviours and goals within this opening scenario, which might conflict or distract from the conditional agreement, added complexity to the decision context, and the task. For example, imagine the following:

> *It is a beautiful day, the sun is shining, and you are on holiday. It is your birthday, and you have received some fabulous presents this morning. You*

have had birthday messages from friends and family. This morning you met your best friend for breakfast, and you have decided to spend the day exploring one of your favourite places together (a description of this follows here, you travel to some place, and spent the day doing something that portrays enjoyment, and happiness). You are planning to meet up with a group of friends for dinner this evening to celebrate your birthday (after more description, you meet up with friends). At dinner, two of your friends (John, and Mark) are discussing what you'll do to celebrate John's birthday next week. They come to an agreement about that event.

The inclusion of content that is not directly related to the conditional rule seems to draw attention *away* from the conditional rule, and to encourage a search through the scenario to see if there was something contained within it that would affect the agreement, or the selection task (the first scenarios were tested on a cohort of students, *N* = 5, and this was what they did). This additional content and participant response to its presence, functioned to pull participants out of being immersed within the unfolding episode, rule and selection task, and to focus their attention on an interrogation of the opening scenario for something they may have missed (a little like the behaviour observed when attempting to process garden path sentences, e.g., Slattery, Sturt, Christianson, Yoshida, & Ferreira, 2013). This behaviour demonstrates the importance of not including factors within task content that might distract from the task. It also perhaps places a constraint on the kind of decision contexts that might be simulated within the selection task. This feature of task content is not surprising, given previous work on relevance within previous selection tasks; it might have been predicted given the assumption of relevance that is made during communication (Searle, 1969; Grice, 1975, Mercier & Sperber, 2011; Sperber, Cara & Girotto, 1995, Sperber & Wilson, 1995; Stenning & Van Lambalgen, 2002).

2.2.10. Relevance to Self

Relevance to self has been discussed within the preceding sections. However, it is worth highlighting this aspect of the task under a separate heading. We cannot

know whether participants in previous selection tasks experienced the content of that task as being relevant to themselves. It seems likely that some participants experienced the content as being relevant to themselves, and that other participants regarded the content as being not relevant to themselves, beyond the relevance it held temporarily as an element of completing the task.

To achieve participant immersion within rather than distancing from the task, the construction of realistic, familiar content, and the evocation of happiness and anxiety, it seems likely that participants will need to believe that the content is relevant to them (e.g., Frijda, 2005; 2009). Perceived relevance to self *can be* an important requirement for the evocation of an emotional response (e.g., Arnold, 1961; Craig et al., 1993; Frijda, 1987; Lazarus, 1991; Ortony et al., Scherer, 2001). If task scenarios are regarded from a more distant perspective, in which the scenarios and events depicted within them seem to be about someone else, it might be more difficult to evoke the targeted emotions when participants complete the task. If we imagine another person within any scenario, our response to the scenario might be affected who the *other* is that we have imagined being in the scenario. Whether we care and what we feel about an event *can* depend upon whether and to what extent we care about the person affected by those outcomes. We might care more, for example, if something good or something bad happened to a parent, spouse, daughter or good friend of ours, than we would if that same thing happened to a vague acquaintance, unknown other or enemy of ours. We might also have different emotional responses depending upon who was affected. We might feel pleasure if something happens to a good friend, and not only feel no pleasure, but also feel anger or jealousy if the same thing happened to someone whom we intensely dislike. If the same events happen to an unknown other, we might feel nothing at all (e.g., Frijda, 1986; Ortony et al., 1988). Immersion within the task might act as another form of proximity.

Evidence that the perspective that is adopted by participants in the selection task can alter their card selections, was discussed above: in Manktelow and Over's (1991) selection investigation. Manktelow and Over (1991) argued that observed perspective effects in the selection task have demonstrated the importance of

preferences, and that the utility of information, objects, events or behaviours depends upon how they relate to your preferences or affect your goals. Although their influences were 'unseen' before the demonstration of perspective effects, utility, goals and preferences seem have an important influence on participant behaviour within the selection task. To understand participant behaviour in this task, we therefore need to consider the effects of these variables. Whether we imagine ourselves or someone else (and what relationship we have with that someone else), being in the situation portrayed within the selection task, thus seems to matter.

2.2.11. Self-Other in Scenario, Rule and Array…

Within the first selection tasks that were developed for this project, participants were asked to imagine themselves within the scenarios described within the opening scenarios, ground rules and card array items. The reasons for this are discussed throughout this chapter, and in the ones that follow. Participants' perspective within this task was thus as *self*. Other features of the *emotion-as-content* conditions describe their perspective within the task more thoroughly. In each of the scenarios developed for this task, participants and another party agreed to a pragmatic ground rule, which included the cost-benefit distribution of a social contract (see section 2.2.15 for further discussion of this feature). S*elf* and *other* were positioned within the conditional agreement (*self* in the antecedent, and *other* in the consequent position), and the card array items (*self* in *p* and *not-p* items, *other* in *q* and *not-q* items). Perspectives might be switched within this design, by asking participants to take the perspective of other, or that of a third party. The inclusion of two parties in the conditional was discussed above (see section 2.2.6, on the conditional). The introduction of this element to two previous investigations with the selection task (Manktelow & Over, 1991; Gigerenzer & Hug, 1992) demonstrated that the selection task could be used more flexibly than it had been previously: to investigate different kinds of social and formal agreements, for example, to explore these from different perspectives, and to change the utility or importance of the scenarios that were investigated within the task. These two publications provided an important stimulus to the current research.

In the first new selection task versions, participants thus were asked to imagine themselves and another person within the situations described. At the start of the development phase, the nature of who that other person was differed. In some scenarios the *other* person was 'known' (e.g., they were a friend, or teacher, or sibling, or partner, or parent), in other scenarios, the *other* party was 'not known' (e.g., they were an unfamiliar train guard, a shop assistant, or garage mechanic). As the tasks were developed further, the process of which is outlined in the following chapters, it seemed important to control this element of the context, and so the *other* party included in the pragmatic agreements was either a close friend, or partner, or work colleague. Inclusion of two parties within the rule components who had different kinds of relationship, seemed likely to introduce additional factors that could influence behaviour differently between tasks. An agreement between a parent and child, for example, might carry different expectations and consequences than would an agreement between you and a train guard, or between you and a good friend. This situation would have complicated data analysis, and represented a potential confound. The relationship between *self* and *other* was controlled to avoid this potential confound within these tasks. As the emotional induction element of the scenarios progressed, it was also easier to construct scenarios that might be adapted to evoke either happiness or anxiety, if the pragmatic agreements were made within personal relationships.

2.2.12. Goals

It may be that goals provide no more than another way of framing or considering *relevance to self*. However, consideration of this factor again here, provides an additional insight into the possible influence of goals on task behaviour. Much of human behaviour can be thought of as being about the pursuit of goals (e.g., Arnold, 1960; Barsalou, 1982; 1991; 2008; De Souza, 1986; Evans, Over, & Manktelow, 1993; Frijda, 1987; Nozick, 1993; Oatley & Johnson-Laird, 1987; Over & Manktelow, 1993). Goals have been shown to play an important role in decision-making (e.g., Deci, Koestner & Ryan, 1999; Isen, 2000; Simonson, 1990). It might not be possible to separate the subjective utility of agreements and outcome behaviours within the card array from participant goals. Goals vary in importance,

in their reach into other aspects of our lives, in their perceived relevance to the present moment or context, and in their positioning in relation to other goals (e.g., relative importance, conflicting or complementary, mutually or unilaterally independent, or dependent, or exclusive) (e.g., Carlson, Tanner, Meloy, & Russo, 2014; Ryan, Sheldon, Kasser & Deci, 1996). Context has been shown to modulate perceived relevance, and the perceived importance of information for goals (Arnold, 1960; Blanchette & Caparos, 2013; Evans, 2002; Sperber et al., 1995; Ortony et al., 1988; Girotto, Kemmelmeier, Sperber & Van der Henst , 2001). If we are actively pursuing a goal, our attention is directed towards information that seems to be relevant and important to that goal, our thoughts include content that is relevant to the achievement of that goal, and our behaviour is directed towards achieving the goal. Within the selection task participants are given a goal – to decide what information needs to be checked to determine whether someone has violated, broken or adhered to a given rule or agreement. Participants are conscious of this goal. If emotions activate other goals within the task setting, such as the avoidance of information that might disrupt a happy mood, or confirming that what we feared has happened (e.g., being let down by a friend), these goals might direct participant behaviour in the selection task. Goals that are activated or associated with emotions, might or might not be available to conscious awareness. Emotion might alter the subjective utility of the agreement, and of subsequent behaviour that adheres to or violates that agreement. Given the possible influence of goals on perceived relevance, utility and task behaviour, it was important not to include task content that could activate other goals during completion of the task. Understanding what participants are doing in the task, what goals *they* are attempting to realize, might be the key to understanding behaviour in these tasks.

2.2.13. Avoid Heavy Cuing of Rule-Breaking or Rule-Adherence: Manage Expectations

To allow for observation of the possible effects of emotion-as-context and content on card selection behaviours, it seemed important to avoid heavy cuing of expected rule violation or adherence within the new selection tasks. If, in the opening scenarios for example, participants were informed that the other party had broken their agreements in the past, and that it seemed unlikely that they would do as you

had both agreed, there might not be sufficient room for possible influences of happiness or anxiety on card selection patterns to be seen. Further than this, Manktelow's and Evans' (1979), discussion of the availability of rule-falsifying instances is relevant here; memories of rule breaking behaviours or falsifying instances from experiences prior to the task, which are like those presented within the task, might effectively *point* at rule breaking behaviours or falsifying instances in this task. If instances of previous rule violations might come to mind, these behaviours might be seen as being relevant to the task. Participants might then select task data that had, in this manner, been cued as being relevant to the task. Content that points too strongly towards expected rule-breaking or rule-adherence behaviours might operate in a similar manner, and interfere with the possible effects of emotion by leaving little room for emotion-related effects (e.g., Ashby, Isen & Turken, 1999; Bonnefon, 2009; Eysenck, 1997; Isen, 2000; Lazarus & Folkman, 1984; Mathews, Mackintosh & Fulcher, 1997). If participants are told that a person never keeps an agreement, before being asked to select evidence to see whether that person broke an agreement, participants might interpret this information as being a direction, that they should select the 'pointed at' cards. Such heavy pointing at cards might produce ceiling or floor effects.

2.2.14. Deontic

One of the main differences that has been highlighted between Wason's original 'abstract' versions of the selection task and the later, thematic versions which seemed to result in a higher incidence of correct hypothesis testing behaviour, is what participants were asked to *do* in these tasks. In many of the earlier tasks, participants were asked to test the truth or falsity of a given rule that was said to apply to a specific set of cards, by considering whether individual cards could support or falsify a given rule. The conditionals used in this kind of early task were indicative conditionals. In the later, thematic versions of the task, participants were asked to determine whether the actors portrayed within a specific scenario had broken or violated given prudential agreements, rules, or laws. The conditionals used in these later tasks were deontic; they represented rules or agreements that were designed to guide or govern behaviour. In these tasks, participants were

asked to engage in practical reasoning, about what they should or should not do. It was argued that this difference was responsible for the different selection patterns that were observed within the different versions of the selection task. The two versions have been categorized as being different tasks (e.g., Cheng & Holyoak, 1985; Manktelow & Over, 1990; Over & Manktelow, 1993).

The two different versions of the task were initially regarded as requiring different kinds of reasoning – indicative, or deontic. The labelling of the information processing that occurred within these two task versions provided a clean separation between two apparent kinds of reasoning. It has since been argued that both indicative and deontic forms of the selection task could involve practical reasoning, about what one should do, and theoretical reasoning about matters of truth and what one should believe (e.g., Bucciarelli & Johnson-Laird, 2005; Manktelow & Over, 2012; Over & Manktelow, 1993). However, deontic forms of argument are widely used within everyday decision contexts, and they seem to be an important tool for practical decision-making. Practical reasoning about deontic conditional rules or agreements forms an important part of everyday decision-making, and so this version of the task was selected for development within the current research. Deontic ordinary conditionals are used to formulate binding prudential everyday agreements, social contract or laws that apply to everyday behaviours (e.g., work-based procedures, travel rules, health as safety rules, social plans, household rules, and driving regulations). They therefore provide a useful, everyday familiar vehicle through which the influences of emotion on everyday thinking and decision-making can be investigated.

In most previous deontic versions of the task, the conditionals have been situated within a social context. Although this feature has been largely ignored in previous versions of the task, it has been argued that we need to understand how the social context influences behaviour, because this factor is considered when we decide how to act in relation to a given rule (Manktelow & Over, 1995). The social context can have important influences on language use, meaning, and behaviour, through factors such as positioning within social roles, forms of authority and goals that are

active within different social settings (e.g., Gigerenzer 1996, Gigerenzer & Hug, 1992; Hahn & Harris, 2014; Hilton, 1995; Searle, 1969).

2.2.15. A Social Contract

Within her social contract theory, Cosmides (e.g., Cosmides, 1985; 1989; Cosmides & Tooby, 2000; 2004) argued that our evolutionary experience of living in social societies that have depended upon social exchange, has given us an understanding of the implicit rules of social exchange: '*if you take a benefit, you pay a cost*'. This experience has made us exceptionally good at catching rule breakers, that is, those who take a benefit without paying the required cost. Cosmides used this account to explain why we seemed to perform better in deontic versions of the selection task. According to Cosmides, the different selection patterns that were observed in deontic forms of the selection task were the result of our evolutionary learning; this learning had led to the creation of a brain programme that functioned to detect cheaters within social contract settings, and this programme made us smart. Better performance in a social contract setting was the result of our expertise in looking for cheaters. Previous versions of the selection task in which 'facilitation' was observed, were said to contain social contracts. Following Cosmides' claim, in subsequent studies with the selection task, it was demonstrated that facilitation was observed in studies that did not meet the requirements of the social contract (e.g., Gigerenzer & Hug, 1992; Perham & Oaksford, 2005). It seems that a social contract setting was not therefore a necessary requirement for observation of that card selection pattern. However, facilitation was observed in studies that used the social contract format. This factor therefore seemed to influence participant behaviour.

The social contracts that were developed for previous deontic versions of the selection task, engaged two parties in a contract, which offered a social exchange of benefits and requirements or costs between them (e.g., Cosmides, 1989; Fodor, 2000; Gigerenzer & Hug, 1992; Van Lier, Revlin, & De Neys, 2013). To benefit from an advantageous agreement, one must qualify for the benefit by meeting a requirement or paying a specified cost. Cheating or breach of contract occurs if one

party accepts a benefit and fails to meet the requirement, or to pay the required cost. Those benefits and costs were not necessarily equal for each party. However, this social exchange provided a rationale for the agreements.

Everyday familiar social settings contain social contracts, and the social contract provides a useful setting in which to investigate the influences of emotion on everyday deontic reasoning using pragmatic, social agreements. The cost-benefit distributions of the social contract provide a natural context in which emotions might easily arise. Two parties can be engaged in a prudential social agreement that takes the form of a social contract. For example, *if a does x, then b must do z*. In this case, in order to benefit from the exchange (achieve *z*), party *a* must pay a cost (do *x*). For *b* to benefit from the exchange (achieve *x*), they must pay a cost (do *z*). For the agreement to function effectively within the constructed social setting, the costs might need to be actions that both parties would not otherwise have done. If either party would have paid the cost regardless of the agreement, the agreement might seem to be less necessary, plausible or significant. To avoid inferences of unfairness or implausibility, and thus avoid circumstances that might interfere with the successful induction of happiness and anxiety, it seems probable that the exchange and agreements would need to be balanced fairly in benefits and costs for both parties. The cost-benefit distribution within the conditional and card array provides a meaning or rationale for actions within the task, for actors and agents who are depicted within the tasks, and for participants who are completing the task.

As the social contract has been shown to provide a plausible explanation of facilitation in some previous selection tasks, unless this factor was included or not included in all versions of the new selection task, it would not be possible to determine whether the inclusion of a social contract in some task versions but not others, had influenced participant behaviour. The first versions of the new selection task were therefore developed to include social contracts. Fitting the conditional contracts constructed for the new task versions to similar cost-benefit distributions, or social exchange models, should allow the data obtained from these studies to be

considered meaningfully alongside that obtained from previous studies with the selection task.

2.2.16. Cheater Detection and Rule Violation Instructions

The task instructions given to participants in previous versions of the selection task differed across studies, and the facilitation effect was, at times, argued to be a product of task instructions. Cheater detection instructions were closely associated with the social contract. In Cosmides' social contract versions of the selection task, different task instructions were used. In one task, for example, participants were asked to '*indicate only those card(s) you definitely need to turn over to see if any of these boys have broken the law*'. In another task, participants were asked to '*indicate only those card(s) you definitely need to turn over to see if any of these men are breaking the rule*'. In yet another task, participants were asked to '*indicate only those card(s) you definitely need to turn over to see if of any of these people violate this rule*'. In another version, participants were asked to '*indicate only those card(s) you definitely need to turn over to see if Bo has broken his word to any of these men*'. The focus of these instructions was to check for rule violations, rule or law breaking, or breaking of a promise. Participants had been cued into a perspective in each instance of someone who had very good reasons to expect to find evidence of cheating. Apparent facilitation effects were observed in these tasks. It might have been the high expectation of cheating rather than the instructions that produced the apparent facilitation effect.

Rule breaking instructions were used by Manktelow and Over (1991) in their mother and son experiments. Participants in those tasks were asked '*which cards would show whether the mother [son] had broken the rule*'. In some previous deontic versions of the selection task, participants were given *rule violation* instructions. Gigerenzer and Hug (1992) used a version of these instructions; participants in study one, for example, were asked to "i*ndicate only the card(s) you definitely need to turn over to see if any of these [actors] violate the rule*". Yachanin and Tweney (1982) had argued that the facilitation effect that had been observed in many thematic versions of the selection task was a consequence of the rule

violation instruction. They argued that this instruction effectively told participants which cards to select. However, Griggs and Cox (1983) demonstrated that rule violation instructions were neither necessary nor sufficient for the facilitation effect. These authors concluded that familiarity with the rule is required for the rule violation instructions to produce a facilitatory effect. Gigerenzer and Hug (1992) argued against this interpretation and put forward the claim that facilitation in previous versions of the selection task were caused by perspective effects, and available cheating options. In most previous versions of the selection task, the scenarios created unilateral cheating options – only one party could cheat or properly violate the given rule. In these instances, participants were more likely to select the cards that might reveal evidence of that party cheating (usually *p* and *not-q*). When bilateral cheating options were included within the task, which Gigerenzer and Hug (1992) included in their scenarios, both parties might cheat. Card selection was then determined by the perspective adopted by participants in relation to the rule. If two parties might be cheating, selection patterns would reflect that possibility by including more cards from the array (i.e., those that might reveal evidence of cheating, perhaps all four cards in the array).

The apparent facilitation effect is not being investigated in this research, and neither is it sought. The effects of instructions are being considered here because of previous suggestions that they have influenced participant behaviour in previous versions of the selection task. The new tasks are being designed to avoid heavy cuing of cheater and rule adherence expectation for task participants, to leave room for the possible effects of emotion on card selection. It seemed wise not to use instructions within the new tasks that might effectively point participants to selection of the *p* and *not-q* cards (a *look for cheater* effect), or the *p* and *q* cards (a *look for rule-adherence* effect). In an effort not to bias participant selection in either direction, the instructions used for the first selection task, asked participants to select the cards that would demonstrate *whether or not the agreement had been broken*. The conditionals constructed for the first versions of the new selection task, could provide bilateral cheating options as there would be two parties within the

agreement who might break the agreement, or 'cheat'. This factor might influence card selection patterns within the new tasks.

2.2.17. Generalisation Across Participants

The variables controlled and manipulated within the new selection tasks, need to function similarly across participants. This factor might seem obvious, however, it seems worth mentioning in light of the variables that are being investigated here. The issue is not generally mentioned or discussed in the reporting of experimental investigations, although it is considered when potential differences are investigated between cultures or clinical populations. Emotions are responses to ideas, events, behaviours or objects that matter to us. We often (perhaps always) attach different utilities and importance to what might, from a hypothetical position of objectivity, seem to be the 'same' events, objects or behaviours. We have different ideals, values, goals, beliefs, relationships, memories, levels of expertise, and preferences. These factors influence when and why we become emotional, and how we respond when we do. Constructing opening scenarios and agreements that will serve as effective stimuli to any emotional response across participants, is therefore not an easy task. Whether this attempt to create effective stimuli to happiness and anxiety succeeds, will be discussed in the closing chapter of this thesis. However, in the process of constructing stimuli that are effective stimuli to happiness, anxiety, and 'no' emotion, the need for them to function across participants was a key consideration when selecting content that could, and should not, be included. Activities that might be idiosyncratic, and thus not within the direct experience of participants, or seemed likely to evoke different responses within the cohort were not included within the scenarios developed for these first tasks. Watching football, playing cricket or rugby, bird watching, salsa dancing, or getting drunk, for example, which might be familiar, pleasurable everyday activities for some study participants, but seem unlikely to be experienced in this manner by most participants. The participants who would be used in the first studies, would be drawn from students and staff at the University of Leeds. What their daily experiences might be was considered during the construction of task materials. Activities, language or behaviours that might breach moral, legal, institutional or social codes of behaviour

were also not included within the materials developed for this research programme, due to uncertainty as to how participants might regard and respond to these emotionally (e.g., Alvarado, 1998; Jay & Janschewitz, 2008; Storm & Storm). Content that seemed unlikely to function similarly across participants, as effective stimuli to happiness or anxiety, or within the neutral condition as a familiar activity, was not included within the new selection task versions. Many examples of this kind of content were included within initial trial task versions. It was perhaps in their inclusion within the exploratory early stages of task construction, that the significance of this factor became salient.

2.2.18. Omit Negations

The use of negations within conditionals has been shown to influence participant responses in previous versions of the selection task (e.g., Evans, Clibbens, & Rood, 1996; Evans, & Handley, 1999; Oaksford, 2002; Wason & Johnson-Laird, 1972). This topic has been the focus of a substantial body of research. Negations form a common part of everyday life, and meet the requirements of realism, familiarity, and relevance to important goals, events, and behaviours. Inclusion of this factor within task materials would require either its operationalization as an independent variable, or the use of negations in all materials as a way of controlling for possible effects. Negations might be introduced to future task versions to examine their influence. Overt and indirect negations were included in conditionals within some of the very first materials that were constructed for the new tasks, whilst exploring what content might be used within these tasks. As the guidance for constructing materials and the development of materials progressed, however, the decision was made to not include negations in the conditionals used in the new selection tasks. Their exclusion, it was hoped, would avoid the possible confounds and additional complexities of analysis and that would be required if they were included within these tasks.

2.3. Summary

In this chapter, the key goals that were used to guide the construction of the new selection tasks are described. The key factors that seemed to influence card selection frequencies in previous deontic versions of the selection task were then presented and discussed. The operation of many of these factors interact, and it might not be possible to separate them in practice. However, their explication here draws out some of the challenges involved in the construction of a new selection task, and demonstrates some of the complexities that might exist within realistic decision settings; these factors seem likely to be important features of many real world decision settings.

Chapter Three. Selection Task Structure and The Social Contract

Development of The First Selection Tasks: Initial Sketches, Task Structure, Components, Social Contracts, Emotions, Benefits and Costs.

This chapter provides insight into the next phase of developing the new task. The essential structural features of previous selection tasks are discussed. A more detailed discussion of social contracts, the ways in which costs and benefits might function within them, and the possible interaction of emotions with costs and benefits is then presented. The explication of costs and benefits that is presented here was developed during task construction as a consequence of the iterative, considered process that was followed to create a selection task that *would* function as a robust research vehicle, through which these factors could be controlled and manipulated in future studies to examine their effects.

3.1. Development of the First Draft Selection Tasks.

The materials constructed for the new selection task, were developed through a lengthy, iterative process, of writing, assessing, revising, discarding, recreating, rewriting, assessing, and revising. This process was exploratory, and systematic. The first attempts to construct a new version of the selection task that would be adequate for use on this research program, were brief sketches, or outlines of situations, and rules, or social agreements that might function within them. After the production of several possible opening scenarios, and the conditional rules or agreements that might be found within those settings, it became clear that the content was too situated within my experience, and these first examples seemed unlikely to generalize across research participants. Some means of broadening my focus and structuring the process was needed. The creation of a list that included time of day, days of the week, some examples of everyday occupations, events and people who might be involved in task scenarios, provided a useful solution (the list is displayed in Table 4). This list was used as an initial stimulus to the process of

Table 4. List items devised to structure and drive construction of the first selection tasks.

Settings	Examples				
Days	Weekday	Saturday	Sunday	Weekend	Week
Time	Morning	Lunchtime	Afternoon	Evening	Night
Events	Get Up	Breakfast	Lunch	Dinner	Holiday
	Party	Birthday	Day Out	Exam	Crash
	surgery	GP Visit	Interview	Social	Working
Actions	Shopping	Dating	Waiting	Studying	Course Work
	Eating	Drinking	Showering	Standing	Reading
	Talking	Singing	Sleeping	Kissing	Watching
	Writing	Walking	Running	Driving	Travelling
	Flying	Cycling	Skiing	Sailing	
Transport	Car Bus	Train Boat	Bicycle	Plane	On Foot
Locations	Home	Library	Gym	Station	Shop
	Street	Park	Field	Platform	Work
	University	Restaurant	Cafe	Bar	Museum
	Cinema	Dentist	Stadium	Mountain	Hospital
People	Parents	Relatives	Strangers	Neighbours	Close Friends
	Manager	Lecturer	Colleagues	Guard	Casual Friends
	Employee	Waiter	Examiner	Importance	Attractiveness*

locating and describing situations in which everyday pragmatic agreements might be made; it provided a way of structuring the task, envisioning behaviour and events, and a practical way of approaching the construction of task materials. Draft sketches of the first materials were drawn from these brief descriptions, by constructing possible ground rules and scenarios that might occur within the listed settings. In some instances, a rule was constructed first, and an opening scenario that could provide a realistic, everyday setting in which this rule might exist was drawn around this first idea. In other instances, an opening scenario that was intended to simulate an everyday setting was constructed first, and a rule that could function within this setting was then drafted.

The very first versions of the new selection tasks were constructed whilst conducting the initial search of reasoning and emotion publications, for guidance on how one should construct a selection task, or emotion inducing scenarios that could

be used in the new tasks. The act of writing and assessing draft, possible scenarios that might serve as contexts, rules and card array items for the new selection tasks, served as an important stimulus to thought and to the development of the tasks. It became easier to think about and identify what factors might be functioning within concrete drafted scenarios, whilst engaged in the process of writing. The writing process made it easier to realize where the variables that had been identified in previous versions of the selection task (such as goals, and congruence between task components) might function within different everyday settings. Additional variables that should be controlled within task content (such as the temporal positioning of benefits and costs, which is discussed in the next chapter), were also identified during the process of constructing task content.

3.2. Basic Task Structure.

3.2.1. Task Components.

A basic task structure had been used in most previous versions of the selection task (e.g., Sperber et al. 1995). Deontic versions of the selection task have contained four components. The first is an opening scenario that provides a rationale for the conditional rule, which might be written in narrative form. The second, is a conditional statement, which functions as a rule and takes the form '*if p, then q*'. The third, is a usually graphic representation of an array of four cards, which contain instances of behaviour (or objects) that relate to the rule. Each card represents an instance that satisfies *p* or does not satisfy *p*, and satisfies *q* or does not satisfy *q*; each card thus contains either *p* or *not-p* on one side, and either *q* or *not-q* on the other side. One side of each of these four cards is hidden from view. What is visible to participants within the card array is *p*, *not-p*, *q* and *not-q*. *P* represents a case in which the rule antecedent is satisfied, *not-p* represents a case in which the antecedent is not satisfied, *q* represents a case in which the consequent is satisfied, and *not-q* represents a case in which the consequent is not satisfied. The fourth component is the nature of task instructions. The participant is instructed to select the cards that must be turned over, to determine whether the rule has been adhered to, or more frequently, violated. The new selection tasks were designed to

follow this structure. Although *p* and *not-q* have been regarded as the logically correct selection in most previous selection tasks, the introduction of 'perspective effects' (Gigerenzer & Hug, 1992; Manktelow & Over, 1991) demonstrated that what has been regarded as the correct selection according to a normative standard, depended upon the perspective adopted by the participant. Previous selection tasks contained a unilateral cheating option; the behaviour of only one party was represented within the conditional and the behaviour of that party was represented within each of the card array items. If two parties are included within the social contract, the deontic conditional, and the card array items, both parties can violate the rule and be investigated for evidence of rule violation within the task. The cards that might provide evidence of rule violation then depend upon the content contained within the conditional rule, and the perspective adopted by the participant.

3.2.2. Additional Requirements.

The first drafts of the new selection tasks also had to meet the following requirements: they should meet the requirements of a social contract, the conditional presented within them must be deontic, and the conditionals should be realized as familiar, everyday regulations, social agreements, or ground rules, which functioned to guide or regulate behaviour in the given setting. The opening scenario must present a realistic familiar setting, and provide a meaningful context in the which the conditional could operate. As they needed to function as stimuli to happiness or anxiety, the opening context and conditional should also contain content that might evoke those emotions. At this stage, it seemed that the content contained within the conditional (and then card array, as rule-related behaviours) might act as the key stimulus to the emotional response targeted within that condition, so that the effects of happiness and anxiety on the task that participants were engaged in could be examined within this research process. The opening context in which the conditional was situated was thought of as needing to provide an appropriate setting for the conditional *and* the targeted emotional response, in which appropriate emotion eliciting conditions could be presented. The opening

context might present participants with an opening narrative that evoked either happiness or anxiety in participants, thus providing a rule-congruent emotional setting within the *emotion-as-content* condition. The opening scenario might prepare participants for the targeted emotional response to the conditional, by providing sufficient preconditions or antecedents for its arousal: in effect, by priming or lowering the threshold required for that emotion to occur in response to the emotion eliciting conditional and subsequent behaviours (represented within the card array items). Examples of the first sketches for the new selection tasks, and their weaknesses are presented in Figures one and two below. These were crucial developmental tools within the construction process, for drawing out what factors might need to be considered and controlled within and between conditions for the new tasks. Inclusion of them here provides concrete examples of how the factors discussed within this chapter might arise in realistic contexts, and a means of grounding this chapter within the practical process of task construction.

3.3. Social Contracts, Benefits and Costs.

At this stage too, the social contract was set out as it had been by Cosmides (e.g., 1985; 1989) and Gigerenzer and Hug (1992): '*if you take a benefit, then you must pay a cost, or meet a precondition*', or '*if you pay a cost or meet a precondition, you may take the benefit*'. Within her social contract theory, Cosmides (e.g., Cosmides, 1989, Cosmides & Tooby, 2000; 2004) argued that we have evolved to be good at catching rule breakers or cheaters, because our brains developed within a setting of social exchange that required people to cooperate for their mutual benefit, in order thrive. The result of this evolutionary history is that we automatically represent and operate upon costs and benefits within a social exchange setting. Cosmides presented the theory as an explanation for participant behaviour in the selection task; our cheater detection algorithms are activated when reasoning about deontic conditionals, within the selection task and in the world beyond this task, and they enable us to perform well in this task and when negotiating our social worlds. Good task performance was defined by Cosmides (e.g., 1989) as being a high probability

Sketch 1. A friend is short of money this month, and can't afford to pay their rent, you have money saved and could afford to lend them the money until the end of the month. You need the money to be repaid. They have tickets for your favourite band, which they offer you as an incentive if you loan them the money for their rent.

Agreement *If I loan you money, you'll give me free tickets for my favourite band*

Difficulties Contains a source of concern that was not in the constructed agreement, which might evoke greater anxiety than might $\neg q$; the friend not repaying the loan. This might impact upon perceived *benefit for self* within the agreement, and result in a cost-benefit distribution that offers insufficient benefit for the party offering the loan. Unclear how tickets valued. If repayment of the loan was situated as *q*, this issue might be resolved. However, would then need to construct value in offering the loan. Benefit in offering loan, not as straightforward as a benefit that unrelated. If repayment instead positioned as benefit, and loan as cost for self, odd benefit… regaining something that was yours that you lost temporarily, and chanced losing longer term, possible and realistic but unpredictable how participants will view benefits and costs. Resulted in exclusion of this scenario.

Sketch 2. You have fallen out with a friend whom you have known for many years, following an argument last week. You are worried that you might not make up, so you arrange to meet. You suggest a way to get beyond this and get back friendship that you value:

Agreement *If you apologise to them (p), they will apologise in return (q)*

Difficulties. Concerns with this scenario and agreement were that participants might object to the nature of the agreement; without having sufficient information to determine whether this seemed to be a far and plausible exchange, it was not possible to determine whether likely to be viewed as being plausible or reasonable, and thus binding (arguments with friends, feelings associated with that in participant experience, it might evoke additional emotions, such as anger, sadness, for example).

Sketch 3. You are staying at your parents' house, your parents are away on holiday. You and your friends want to hold a party; this seems to be a good venue. You are worried about damage, and not keen on too many people coming into their home. So, you come to an agreement with them:

Agreement *If you hold the party in your parents' house (p), they can't bring alcohol or people who're not close friends (q)*

Difficulties. A key concern with this sketch was that the desired emotional response to or the perceived benefit of *p* or *q,* would not generalise sufficiently across task participants. Although the cost-benefit distribution within the agreement might represent a valid social exchange for some participants, the content intended to represent a benefit might be viewed as a cost by other participants. Both *p* and *q* might be construed as being potential costs or benefits.

Figure 1. Examples of initial sketches: Rule contexts and conditionals

Sketch 4. You and friend are doing the same degree, and you have been talking about some of the lectures you've been to. It occurs to you that you could free up some time for other things if you took it in turns to attend lectures and shared notes between you.

Agreement *If you attend lectures today, take notes and let them have copies, they will attend lectures tomorrow, take notes and let you have copies of these*

Difficulties. These instances of *p* and *q* were judged to be not sufficiently reliable for the task. If *q* functioned as a benefit for participants, which it might not do, the cost of $\neg q$ seemed likely to vary between participants. One friend might take poor notes within lectures or fail to take notes at all, and if the other was concerned about note quality, the agreement would be a poor one. If either party was unconcerned about lecture notes, the importance of the agreement might also be undermined. The probable values of *p* or *q* and $\neg p$ or $\neg q$ thus seemed unlikely to constitute reliable social contracts for this task.

Sketch 5. You are on a train, going home after being out for a long, stressful day. You're very tired, worried that you might fall asleep, miss your stop. You don't have any money with you, can't afford to miss your stop. Too tired to face a long walk home. Come to an agreement with the train guard

Agreement *If I fall asleep, he'll wake me up before my stop*

Difficulties. There is no readily perceived cost or benefit for train guard, from the perspective of a participant. There may be sufficient cost and benefit for the guard in this agreement, but this cannot be inferred here by the participant. Might introduce different elements to task, and confound *emotion-as-content comparisons* unless this kind of exchange and relationship used across conditions.

Sketch 6. You were out yesterday evening with friends, and you saw one of your friends kissing someone you hadn't seen before. This morning they asked you not to tell anyone what you'd seen, because they were seeing someone else and didn't want to spoil that relationship. They offer to return the favour by doing something for you.

Agreement *If you don't tell anyone that you saw them kissing last night, they will do X for you*

Difficulties. The content for *q* was not developed for this scenario because it was difficult to construct a plausible example that might fit here. More significantly, this scenario seemed likely to evoke emotions that were not targeted for this study. Predominant possible emotions from either party in the scenario were judged to be anger, embarrassment, anxiety, and perhaps pleasure or schadenfreude. A breach of social code? The inclusion of too many 'friends', was also judged possible source of confusion (garden path?), might distract focus from the agreement.

Figure 2. Examples of initial sketches: Rule contexts and conditionals

of selecting the cards that might provide evidence of cheating, and not selecting cards that would not be helpful in determining whether cheating had occurred. Subsequent research investigations that sought to test Cosmides' theory, focused upon finding situations in which deontic reasoning with ordinary conditionals occur that are not social contracts; and thus in demonstrating that a cheater detection system cannot explain competence when reasoning about, understanding and responding to things such as threats, or advice, which are often presented as conditionals (i.e., *if you do p, then q*).

According to Gigerenzer and Hug (1992), two parties are engaged in a social contract. One of these parties is an authority who sets a rule or regulation, who might be thought of as the 'agent', and the other is someone who is subject to that rule, who might be thought of as an 'actor' (Gigerenzer & Hug, 1992). This has been the most frequently investigated form of social contract within the selection task. In this scenario, if the agent is also subject to the rule, they function as both agent and actor. If a social contract has been established by an agent, to encourage or govern specific behaviours, the contract might take the following form:

'*if you take a benefit, then you must pay a cost*'[11],

or

'*if you pay a cost, you may take the benefit*'.

The cost (or meeting of a precondition) is required to rightfully gain access to the benefit, if the cost is paid the benefit is then permitted. Rightful access to benefits is conditional upon payment of a cost. Paying someone for food or buying a car might be understood as social contracts of this kind. So too might working in exchange for payment or entry into an event that you wouldn't otherwise be able to attend, or adhering to a parents' rule in order to obtain something that you value. A social contract might also be found in less formal arrangements, in which there are no established rules governing behaviour, and in which one party has no obvious authority over another: within pragmatic, prudential social agreements

[11] A cost is not necessarily required in a social contract: satisfaction of a stipulated requirement can be sufficient qualification for a given benefit (e.g., Cosmides, 1989, Gigerenzer & Hug, 1992).

between colleagues, family or friends (Cosmides, 1989, called these 'private exchange' social contracts). In these circumstances, the rules might take the form of joint or mutual agreements, in which both parties agree to an exchange of benefits and costs. Both parties might here be thought of as being both agent and actor. Within these kinds of social contract, the exchange is conditional - each party provides a benefit for the other on the condition that the other party provides a benefit in return (Cosmides, 1985; Cosmides & Tooby, 1989; Tooby & Cosmides, 1996). Within a prudential social agreement that takes the form of a social contract, the agreement might take the following form:

If *a* does *x* (Cost to *a*, benefit for *b*), then *b* must do *z* (cost to *b*, benefit for *a*)

In this case, to benefit fairly from the exchange (achieve *z*), party *a* must pay a cost (do *x*). For *b* to benefit fairly from the exchange (achieve *x*), they must pay a cost (do *z*). If either party accepts a benefit, that is, benefits from the behaviour of the other (that was promised in the exchange) without in turn paying the cost (i.e., providing the agreed benefit for the other), they may be said to have gained the benefit unfairly and violated the agreement[12]

3.3.1. Introducing Emotion: Social Contracts, Costs and Benefits.

Previous investigations that have been conducted to assess the validity of Cosmides' social contract, and associated discussions about social contracts theory (e.g., Gigerenzer & hug, 1992; Perham & Oaksford, 2005; Platt & Griggs, 1993; Sperber & Girotto, 2002), have not included an interrogation of the ways in which social contracts might differ, and neither has Cosmides within her social contract theory. Neither have they included an explication of costs and benefits, or of how emotion might function within social contracts. What effects emotion might have upon the appraisal of social contracts, and what the consequences of that might be, have not been examined within previous publications. The social contract, however, is an everyday situation in which emotions might arise. Emotions are about perceived costs and benefits. To develop materials that would function well within

[12] Cosmides (e.g., 1989, Cosmides & Tooby, 2000) described this behaviour as 'cheating'.

the intended *emotion-as-content* conditions, as effective stimuli to the targeted emotional responses within everyday social contracts, it was important to understand how emotion might arise within these settings. So that the new task would have greater future research value, the new selection tasks were developed to allow exploration of how emotions might influence behaviour in different kinds of social contract. An outline of the issues that were considered for this reason whilst constructing task materials, is included within the following discussion.

If a pragmatic, prudential social contract (a private exchange) is to function effectively within a given social setting, it seems probable that both parties should desire and want to attain the benefit, and be willing and able to pay the cost (e.g., Evans & Over, 2004; Over & Manktelow, 1993). That is, unless one party (or both parties) feels pressured to enter a social contract, perhaps by the other party within the contract, or by others, or because of commitments that have been made. These contracts might also function adequately. In all cases, people have a reason to propose or enter the agreed exchange. It becomes apparent if we consider the above, that the appraisal of costs, benefits and preferences is influenced by context. All benefits are not equal, and neither are all costs.

For now, we will focus upon private exchange social contracts that have been happily agreed to exchange benefits and costs, which were developed for the first versions of the new selection task. In these instances, the costs might need to be actions that *both* parties would not otherwise have performed, or they might need to be actions that *both* parties would have done regardless of the agreement. The social contract does not need to include a fair exchange of benefits and costs. However, within an everyday pragmatic agreement, both parties might need to view the exchange as being fair in order to genuinely agree to the contract. Without genuine agreement to the contract, the contract might easily be dismissed. If the costs for one party were actions that they would need to perform regardless of the agreement, they might not be regarded by the other party as representing real costs, in an exchange where the other party had to do something that was a cost to them that they would not otherwise have done. If the costs were actions that both parties would have to perform regardless of the agreement, they might exchange

costs and benefits within a social exchange if their actions could be altered or directed in a way that would benefit the other. The appraisal of benefits might be similarly affected in an even exchange, although, in this instance your focus might be on whether the benefit to be obtained by you, was worth the cost required of you within the exchange (i.e., was this a fair exchange, and or is it worth it) (e.g., Anderson, Bernauer, & Balietti, 2017; Molm, Collett, & Schaefer, 2006). You might assess these elements in any exchange, regardless of possible imbalances, however the presence of imbalances might alter your perception of benefit and or cost. The appraisal of value and fairness seems to influence our willingness to enter voluntary social contracts. The exchanged benefits and costs need not necessarily be regarded as being mutually fair; the parties who agree to the exchange might be content to accept an agreement, regardless of disparities and not be concerned by them. However, the inclusion of circumstances that might be appraised as being unfair, creates conditions in which emotions such as irritation or guilt could arise. The arousal of *any* emotion other than the one targeted within any of the emotion-as-content conditions, would make it difficult to interpret participant responses within those conditions (i.e., they might be a product of anxiety, guilt, anger, and what effect anxiety had on participant behaviour might be masked).

Although the terms benefits and costs have previously been associated with specific rule-relevant actions, it seems that the benefits and costs laid out in social contracts need not be perceived as *being* benefits or costs by people to whom the rules apply. Within Cosmides' (e.g., 1989) depiction of her social contract, for example, social contracts can be set out or established within law. Examples of this kind include the need to train and qualify before you can lawfully work as a general practitioner, nurse or schoolteacher (i.e., *if you pass your qualifying exams* = cost, *you may work as a general practice doctor* = benefit). One might grasp that these factors can be understood as being costs and benefits, in a detached hypothetical sense, if you understand what costs might be associated with passing the qualifying exams, and the benefits that might be associated with working as a general practitioner, or teacher or nurse. However, if you do not want to work in any of those professions, they might not be regarded or appraised as *being benefits for*

you. Objects, events, or behaviours that are not appraised as being personally rewarding, or potentially rewarding, or appetitive, or amusing, or aversive, or harmful or potentially harmful, should not evoke emotions.

Emotions can be thought of as being *about* benefits and costs[13]: happiness as a response to a perceived benefit (something good has happened, which benefits/ or is rewarding in some way, by improving my well-being, or affecting goal-progress, or bringing pleasure, for example, Ortony et al., 1988), anxiety as a response to feared costs (something bad might happen to me, by negatively affecting something that I value, perhaps by damaging something I have, or by threatening the achievement of desired goals, or by placing me close to something that I fear, Ortony et a., 1988). We get emotional about things that we value (e.g., values, ideals, beliefs, identity, relationships, goals) (e.g., Arnold, 1960; De Leersnyder, Koval, Kuppens, & Mesquita, 2018; De Sousa, 1987; Greenspan, 2004).

However, not all elements that actively offer a benefit and or cost, will evoke an emotional response. Consider, for example, a mundane everyday activity such making yourself a cup of coffee that you want. The actions required to make the coffee can be viewed as costs (they require energy expenditure, effort, and time). The coffee, or drinking the desired coffee, can be thought of as a reward (justifying the costs, providing motivation and explanation for the behaviour). We might feel emotional about these costs and benefits, in the process of making and drinking the coffee, or we might not. Imagine wanting the coffee very much, and that you have taken time away from an important task to make it; you are feeling time pressured, a little tired, and thirsty. If you or someone else spills the coffee before you have managed to raise it to your mouth, you might react emotionally (perhaps with anger): about the loss of the desired coffee, the time it has taken you to make it, the time that you will now have to spend making another one, time which seems like a precious resource, and about the task that you have yet to finish. On another occasion, you might make the cup of coffee, even spill it, without the episode evoking any emotional response. You might not, in other circumstances, be looking

[13] Emotions might include other elements, however, it is in terms of benefits and costs that they are being considered here.

forward to it so much, there might be no other demands on your time when you make it, and you might be preoccupied with thoughts about other matters, which might seem important, or not. In these circumstances, the cost represents no threat to something that we value, and the benefit seems to be of little personal significance (it does not seem to be of great value). The importance of this feature of emotion and its objects, was realized after multiple attempts to construct materials that would function as required within the current research project.

3.3.2. Multidimensional Appraisals and Evoking More Than One Emotional Response.

The above example helps to demonstrate the dynamic nature of emotion, and does so within an everyday setting. Events are dynamic, they unfold over time and include the interaction of multiple factors. Many objects, events, behaviours and people can be valued and regarded as being of importance. However, the degree to which we value any object, event, behaviour or person, or regard them as being important, can change according to context, and our response to these same objects, events, people or behaviours can change in sympathy with the change in value and import. Some objects, people, behaviours or events might be regarded in a relatively stable, enduring manner (such as your parent, friends, favoured sports, your home); their meaning and importance might retain an essential character and not change significantly according to the presence or absence of most other factors. Many objects, people, behaviours or events are regarded in a more changeable manner; their significance and value changing more significantly within different contexts, depending upon the presence or absence of other factors that give them value.

In addition to the question of whether emotions will be evoked or not, another feature of emotions, social contracts and the positioning of costs and benefits within them, was an important consideration when deciding what content to include within the new selection task materials. Many situations, behaviours, objects, or events might evoke more than one emotion, and those emotions can be about different elements of costs and benefits that are contained within the eliciting conditions. An event may, for example, be appraised as bearing costs and

benefits (or to be entirely bad, or entirely beneficial). Letting go of something that is valued in order gain something else that is valued, or accepting a loss of something that is valued in order to avoid a greater loss, both bear benefits and costs. Leaving one job or role, to take up another role or to provide yourself with more time for other things, provides an example of this kind of event. You might feel happy to have your new position, perhaps delighted, but you might also feel a little anxious about starting a new role (in an unfamiliar setting, or in a setting that contains people who you are not looking forward to interacting with). You might also feel sad about losing elements of the old job that you found rewarding. Other emotions might be evoked by the change of roles. Another event, such as the death of a sibling, might be appraised as being wholly bad. In response to this kind of event, you might feel anger, guilt, sadness, and anxiety. Another event might be appraised as being wholly good, such as the purchase of a new house, winning a prize, or escaping early from a party. In this kind of event, you might, for example, feel joy, hope, pride, amusement, compassion and or relief.

The possibility that more than one emotion might be evoked in response to benefits and cost, matters in the current research program. If we value the benefit to ourselves highly enough, we might enter social contracts in which the 'benefits' or 'costs' contain both benefits and costs. We might enter social contracts that represent clearly uneven exchanges of benefit and cost. If the benefit obtained or and cost avoided by engaging in a social contract is sufficiently valued, the exchange might seem to be worthwhile. However, these circumstances introduce additional elements to the exchange that have the potential to evoke multiple emotions within the unfolding of agreement-relevant events. If we agree to do something that seems a little unfair, for example, but we value the benefits of the exchange sufficiently, we might feel pleased with the benefit obtained within the exchange. We might also feel irritated or anxious, or guilty, or relieved about other elements of the exchange. If the cost is later realized to be higher than the perceived benefit, we might not value the benefit obtained within the exchange. The following two situations provide examples of the kind of draft sketches that helped to explicate these possibilities, during the process of constructing emotion-

as-content conditions that would function adequately within the new selection tasks. These factors change our assessment of benefits and costs. However, they have not been considered within previous investigations.

Imagine, you agree to team up with a work colleague to write a new proposal, they have more status at work than you, and you hope that the association will benefit your career. They agree to work with you if you write the proposal; they will provide initial thoughts about the kind of proposal you should write, and then perhaps edit a few points before they submit it to your company. They convince you that the proposal is more likely to be viewed favourably if they submit it, and assure you that is will be regarded as a team effort in which your contribution will be recognized and valued.

Imagine, a relative has offered to stay in your house whilst you are away on a holiday that you've booked at the last minute. They will take you to the airport for your early morning flight and look after your dog whilst you are away. You feel a little uncertain about having them in your house whilst you are not present. You value your privacy and feel a little uncomfortable at the thought that they might look through some of your belongings. You decide it is worth the cost. Your worries are unfounded. They have offered kindly, and they will appreciate the chance to visit nearby friends.

It might not be possible to evoke a single kind of emotional response to realistic social contracts that are situated within everyday social settings. However, that is what is being attempted within this research program. The achievement of this goal required a careful consideration of what costs and benefits might be associated with specific social contracts, whether the content contained within the new tasks was likely to be an effective stimulus to anxiety or happiness, and whether it might also evoke emotions that would interfere with the *emotion-as-content* condition. The deontic conditionals (i.e., social contracts) contained within the new selection tasks, could provide an important focus within the opening scenarios, or they might sit naturally within the content created for the opening context. The conditional agreement should be an important focus for participants within the task, and the content included within the materials should not distract from its importance. As

the content of the scenarios and conditionals needs to act as a stimulus to either happiness or anxiety, it was important to minimize the possibility that the content contained within the conditionals did not introduce anything that might act as an impediment to the realization of the *emotion-as-content* condition that it was situated within. If emotions other than those that were intended were evoked by task content, they might then influence card selection patterns and make it difficult to interpret what or how these different factors had influenced participant behaviour.

In an attempt to make the opening context an effective stimulus to happiness or anxiety, and simulate realistic, everyday decision contexts, some of the first versions included behaviours and events that were not related to the conditional agreement; they were inserted to heighten the emotional nature of the condition, and evoke a context of happiness or anxiety into which the conditional could be introduced. Much of the content inserted for this purpose was not needed for the conditional to be understood. The result of this strategy within the first versions was to introduce elements that could give rise to unwanted emotional responses. In light of the above considerations, it seemed necessary to pare back the narrative that was presented to participants within the opening scenario, to reduce the likelihood that the content would give rise to unwanted emotional responses within the first selection task studies.

3.3.3. Rule Violations: Behaviours That Might be Expected to Evoke Different Emotional Responses.

The above discussion highlights some of the issues that were involved in the creation of materials for the new selection tasks. One additional issue that came to light during construction of everyday scenarios and conditionals for the new selection task, was behaviours or events that involve a breach of cultural, religious or social expectations, of etiquette, or of moral codes, or national laws. Examples of some of these behaviours include lying, gossiping, rudeness, and feeling pressured to work overtime without pay. These kinds of behaviours introduce at least two difficulties. Firstly, they represent behaviours that might be expected to evoke

different emotional responses; some people will approve of and might enjoy engaging in some of these behaviours, other people might react negatively to such behaviours, and any emotional response that follows will depend upon their perspective (e.g., anger, guilt, shame, sadness, anxiety). A second difficulty that these behaviours might introduce to the task, is that they might be regarded by participants as being violations of expected behaviour. As the selection task asks participants to check for a violation of a social contract, it seemed wise to not include other content that represented a breach of established codes of conduct.

3.3.4. Social Contracts, Costs and Benefits: The Temporal Order of Events.

In the imagining of situations that might be used within the new tasks, another factor that has not been explicated within previous considerations of the social contract came to light[14]; whether one needs to pay a cost before benefiting from a social contract, or might the cost be paid after the benefit has been taken. Cosmides (e.g.,1989; Cosmides & Tooby, 2000; 2004) argued that a person was obliged to pay a cost or meet a precondition, to be allowed access to a benefit. When considering the social contract in terms of preconditions and benefits, the relationship seems clear. The precondition must be satisfied for the benefit to be taken, and so the temporal order of that aspect of the social contract is contained within the contract. The legal drinking age rule developed by Griggs and Cox (1982) provides an example of this kind of rule; 'to drink beer (*benefit*), you must be over 19 years of age' (*precondition*). In all published versions of the social contract, the payment of cost has occurred before the benefit could be honestly obtained. There is no reason to believe that the cost must be paid first. In many everyday social exchange contracts, such as in private social exchange contracts or occupational contracts, the cost might be paid long after the benefit has been enjoyed. This is so, for example, in the exchange of favours between friends or colleagues, or when doing tasks for other people in return for payment. Whether this element of the

[14] This might be because other investigations of the social contract theory have sought to differentiate between social contracts and other forms of conditionals that function within different social exchanges (such as precautions, or advice), following Cosmides' attempt to explain our apparent expertise within deontic versions of the selection task, and with all deontic conditionals, in terms of our inbuilt expertise in the detection of cheaters.

social contract might influence behaviour, is an empirical question for future investigation.

3.3.5. Positioning Self and Other within Deontic Conditionals

Within the first versions of the new selection tasks developed for this research program, participants were asked to imagine that they were in the situations described within the opening context, conditional rule and card array items. Oneself and another person were the two parties who agreed to an exchange of costs and benefits. This positioning was used as a way of trying to increase the probability that the target emotions were evoked within the *emotion-as-content* conditions. Imagining oneself within the situations described was intended to create a sense of realism, immediacy, importance and meaning within the materials, and encourage participants to engage with the unfolding events portrayed within them, rather than adopting a detached position in relation to events[15]. The creation of self and other perspectives also provided a way of changing perspectives within future tasks.

The first deontic conditionals that were developed for the new tasks, were constructed in the following forms:

if you pay a cost (or meet a precondition), you get the benefit
You get the benefit (cost for other), if you pay the cost first (benefit for other)
You get the benefit first (cost for other), if you pay the cost later (benefit for other)

Many of these first versions contained short outlines of everyday settings and conditionals that lacked face validity as being likely stimuli to the targeted emotional responses, and or conditionals that indirectly referenced one of the

[15] Imagining oneself within the scenarios, or engagement with the events unfolding within them, is not a necessary precondition for there to be an emotional response to task content. Participants were asked to adopt this perspective to increase the likelihood that any emotional response would be the one intended within that emotion as content condition (i.e., happiness, anxiety, or little or no emotion).

parties engaged in the exchange of benefits and costs, and or card array cases that failed to represent either *p*, *not-p*, *q* or *not-q*. The following example of an early sketch that contained inadequate conditionals and card array items, demonstrates part of this early process.

If you collect the parcel for me tomorrow morning (p),
you can have the car tomorrow (q)

The card array items were as follows: *you collect the parcel for me* (*p*), *I don't get my parcel* (¬*p*), *you get the car in the morning* (*q*), and *the car is in the garage in the morning* (¬*q*).

The cost within this example was positioned in collection of the parcel (*p*), and the benefit was having the car in the morning (*q*). The car here belongs to the participant (*self*), and *you* is the other party who is engaged in the social contract. That *self* will let *you* borrow the car is implied rather than explicitly represented by *q*. Within the card array, *p* explicitly represents the *p* that was agreed in the contract, *not-p* fails to explicitly represent *not-p* (this could happen even if *p*), *q* fails to explicitly represent *q* (*you* may have taken the car if *self* decided to break the agreement), and *not-q* fails to explicitly represent *not-q* (*you* may have collected the car in the morning from the garage). Some of the early versions of the tasks were constructed in this way with the intention of leaving room for happiness and anxiety to influence how participants interpreted the ambiguity. As mentioned in the opening chapter, happy and anxious participants have been shown to interpret ambiguous information in accord with their expectations. It was thought that anxious participants might be more likely to interpret *not-p* as being evidence of rule breaking by *you*, and that happy participants would be more likely to interpret *not-p* as not being indicative of rule-violation by *you*. It might have been easier for happy participants to imagine possible explanations for this happening after *you* had collected the parcel as promised. Similar responses were expected for *q* and *not-q*.

However, this strategy was not pursued further at that time[16], as it was feared that if the conditional and card array failed to provide clear instances of the behaviour of both parties that explicitly represented the *p*, *not-p*, *q* and *not-q*, participants might be confused by the task, and that the new tasks would not be regarded as being valid versions of the selection task (Manktelow, personal communication, September, 2007). In that event, use of these materials within the first study would not then justify the use of participant time, or the time taken to conduct the study and analyze the data.

As the first versions of the selection task developed, and different options had been constructed and considered, self and other were represented in the conditionals as 'if you (*self*) do *x*, they (*other*) do *y*'. This exchange was presented in two ways, to provide the opportunity to test perspective effects between self and other:

1. If *I* do *x* (cost to or precondition met by *self*, benefit for *other*), *you* must do *z* (benefit for *self*, cost to or precondition met by *other*)

or,

2. If *you* do *z* (benefit for *self*, cost to or precondition met by *other*), *I* must do *x* (cost to or precondition met by *self*, benefit for *other*).

Within the first major study, as participants were asked to imagine themselves within the scenarios described, and that they were experiencing the situation as described within it, the first of these perspectives was tested to control this aspect of design across conditions. *Self* was positioned within the antecedent (*p*), and *p* represented a behaviour (cost or precondition) that would occur before the other party provided the promised benefit in return. The *other* party was positioned within the consequent (*q*), and *q* represented a behaviour that would occur (cost to or precondition met by other) after *p* had provided the promised benefit for other.

Because of the issues discussed within this chapter, contracts that seemed to represent unfair exchanges, or involved a third party, or were likely to contain

[16] In retrospect, it would be interesting to conduct such a study to explore whether participants would behave as predicted. Much information that we process within our everyday lives is incomplete, and we fill in the gaps to infer meaning using expertise, beliefs and expectations (e.g., Ben-Shahar, 2004; Chomsky, 2012; Ulrike & Hahn, 2008).

multiple elements that could evoke different emotions were not included within the first versions of the new selection task.

3.4. Summary

This chapter provides a more detailed discussion of the deontic selection task. It begins with a description of the essential structural features of previous selection tasks. A discussion of the distribution of costs and benefits within social contracts follows, which draws out some of the complexities involved in the assessment of costs and benefits within social contracts. The way in which emotions might function within social contracts and interact with costs and benefits has also been discussed. This chapter provides a way of thinking about these factors that has not been included in previous published discussions of this topic, and demonstrates that previous investigations of this topic have underspecified the ways in which social contracts might function within real world contexts.

Chapter 4. Development and Testing of Nine Selection Task Scenarios.

A comprehensive account of the entire process of task development is too large to present within this thesis, and this is perhaps not needed here. Nine scenarios that were constructed within the process of developing the new selection tasks are presented within this chapter; these include three scenarios from each of the *emotion-as-content* conditions. The scenarios that have been presented here are intended to provide examples of points within the process of developing the new tasks. Their inclusion is intended to demonstrate, in practice, some of what was done in the process of constructing content for the new selection tasks. An outline is presented of the process that was used to develop scenarios that would function as effective stimuli to the targeted *emotion-as-content* conditions. Whether these scenarios might be developed for use within the first selection task study, was determined via a participant rating task that is presented towards the end of this chapter. This rating task was used to determine what emotions might be evoked by these materials within a selection task study, and what elements of the tasks needed further development.

4.1. Construction of Selection Task Content.

Numerous initial sketches for possible pragmatic agreements and opening contexts, which were not then developed beyond that stage, were constructed whilst developing materials for the new selection tasks. The materials that are presented in greater detail in this chapter, were developed from these first tentative, exploratory sketches.

4.1.1. Additional Design Features.

One Scenario Per Emotion-as-Content Condition

After identification of the initial variables that would be used to guide construction of the research materials (discussed in chapters two and three), and the exploration of many different examples that might be developed for the new selection task,

nine scenarios that seemed as though they might be developed to function as appropriate vehicles were produced for the selection task. Three scenarios were constructed for each of the *emotion-as-content* conditions (happiness, anxiety, 'neutral'). Within the first investigation of the effects of emotion on selection task responses, the intention was, at this stage, to use only one of these three scenarios within each *emotion-as-content* condition. One scenario from each of the three *emotion-as-content* conditions would be presented to participants in each of the three independent within-person emotion induction groups. The rationale for this design, was that it should allow for the observation of participant behaviour within and between *emotion-as-content* and *emotion-as-within-person* conditions, whilst minimizing several potential difficulties. It was hoped that this design might minimize carry-over effects of *emotion-as-content* if the content was too effective a stimulus to the intended emotional response (i.e., if 2 or 3 versions of each of the *emotion-as-content* conditions were presented to participants consecutively). It was also hoped that this design would minimize participant boredom and potential demand characteristics that might result from presenting participants with a too lengthy or onerous task.

Labelling Emotions within Task Content and Task Instructions

The emotions that were targeted within each of the *emotion-as-content* conditions (happiness, anxiety, 'neutral'), were not explicitly referenced within the content of the opening context, conditional rule, or the card array items. The exclusion of these emotion labels from the task materials was intended to allow simulation of the conditions that might give rise to the target emotions, within task content, without giving participants a label for the emotion that was being targeted. The intended emotional nature of the materials might be inferred from task content, but it was hoped that not explicitly labelling the emotions would reduce the possibility of demand characteristics (i.e., participants reporting that they felt, without feeling, the labelled emotions whilst reading through the opening scenario, conditional agreements and outcome behaviours depicted in the card array items). It was also decided *not* to include explicit emotional direction for participants within the rating of selection task materials or the selection tasks (e.g., that they might feel

happy, or anxious, or sad, or no real emotion when they read through the task materials). The inclusion of such directions might betray the experimental hypotheses to participants, act as a directive, and or point towards the responses that were being investigated within this research project. Their inclusion might also serve to distance participants from the task content, and or introduce the influence of expected emotions within the task. What participants expect to feel in specific scenarios, has been shown to be a poor predictor of what they *do* feel in those situations when they experience them (e.g., Lowenstein & Lerner, 2003; Lowenstein, Weber, Hsee, & Welch, 2001; Rick & Lowenstein, 2009). Being given instruction as to how you might feel in a given situation, might also alter whether you react emotionally to the situation, and if you do, then alter your emotional response to that situation. In effect, the instruction introduces a second-order level of expectation before participants encounter the materials, which might interfere with their first-order response to task content and spoil the intended *emotion-as-content* condition (e.g., Frijda, 2005; 2009; Lambie & Marcel, 2002).

A Rational for the Social Exchange Contracts

Within the opening context and conditional agreement, a rationale that would provide a plausible account of how and why this agreement had come to be, was developed for the exchange. The rationale led from the situation described in the opening context to the agreement, and was presented at the end of the opening scenario to act as a bridge between the social context in which the agreement took place, and the agreement.

The Temporal Positioning of Costs and Benefits

Within the social contracts that are presented in this chapter, the participant was positioned in the antecedent (*p*); the behaviour that was represented within *p* was positioned as the cost (or precondition) that participants agreed to within the exchange. The benefit that the participant obtained within the exchange was positioned in the consequent (*q*); this benefit was to be obtained within these scenarios after the participant had paid the stipulated cost.

4.1.2. Inducing Emotions within Emotion-as-Content Conditions

At this stage, it seemed that the content contained within the conditional (and then card array, as rule-related behaviours) might, perhaps should, act as the key stimulus to the emotional response targeted within the *emotion-as-content* condition, so that the effects of happiness and anxiety that were *about* the agreement and task that participants were engaged in, could be examined

The opening context in which the conditional was situated needed to provide an appropriate setting for the prudential conditional *and* the targeted emotional response[17]. The opening contexts also provide a setting in which appropriate emotion eliciting conditions for the *emotion-as-content* conditions could be presented. The narrative contained within the opening context could present participants with content that was intended to evoke either happiness or anxiety in participants, thus providing a rule-congruent emotional context for the emotion-as-content condition. The opening scenario might prepare participants for the targeted emotional response to the conditional, by providing sufficient preconditions or antecedents for its arousal: in effect, by priming or lowering the threshold required for that emotion to occur in response to the emotion eliciting conditional and subsequent behaviours represented within the card array items.

If we think about emotions as being responses to objects, events, or behaviours that matter to us, that might, for example, threaten or support important beliefs, or values, or that might impact upon goal achievement (obstacles, and attainment), or as being responses to things that entice, amuse or repel, we have a way of beginning to develop content that might be expected to evoke the targeted emotional responses (e.g., Frijda, 1986; 2009; Ortony et al., 1988. This way of thinking about what emotions are about, was used to determine *what* task content might represent the conditions required for happiness, anxiety, or little or no emotional response, to participants. Objects, events and behaviours that have been

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[17]. The opening context also needed to provide an appropriate setting for the factors that would be controlled within the new tasks (identified thus far, which were presented in chapter two), and a private social exchange (as outlined in chapter three).

positioned as being the antecedents to anxiety or happiness within previous publications, were used to guide construction of the opening context, conditional agreement, and then the behaviours represented by the card array items within the happy and anxious *emotion-as-content* conditions. Emotions, happiness and anxiety included, can be focused on and or be responses to internal or external objects or events[18]. They can be responses to memories of events, or thoughts about events, or responses to other emotional responses to events. They can be based upon hypothetical imaginings of what might happen or has happened, or seems unlikely to ever happen (e.g., Klein, 1980). This element of emotion was used to construct content for the *emotion-as-content* conditions, and it was realized more effectively within task content as the construction of the new selection tasks progressed.

Revisiting Costs, Benefits and Emotions.

It is possible to consider costs and benefits in a dispassionate manner. However, when the costs and benefits are costs and benefits to you, and you are in an emotional state when assessing them, the simulation of which is being attempted with these new tasks, emotion and personal utility are entwined. Emotions evoked within-task could be about the conditional agreement and or *not* about the agreement. It might be possible to evoke emotions within the opening scenario that were not directly associated with the agreements. If that was achieved, it would be necessary to consider possible conflicts between the costs and benefits that were present within and between emotion as content conditions, when interpreting card selection patterns. Emotions are influenced by context (e.g., Frijda, 1986). Imagine, for example, that an event that brought great happiness (a much-wanted marriage

[18]. The act of categorizing perception or thinking as being about internal *vs*. external objects or events is fraught with difficulties (e.g., Kant, 1781; 1999; Putnam, 1967). However, the terms are used here to provide a useful way of separating fantasy, or subsequent thoughts about objects, or imagining events or objects or ideas, and perceiving and thinking about things that we encounter in the world. This distinction here is about what the objects of the emotions are – whether they are evoked by our thoughts and imaginings, or by our perception of things in the world. The distinction is difficult to maintain in any discussion of emotion. However, it has been included to provide a more comprehensive account of how emotions can arise, it is relevant to an understanding of emotion within the selection task, and it was one of the factors that was used to think about how to create content that might be realistic within the new selection tasks.

proposal) was presented within the opening scenario before an unrelated pragmatic, social agreement (e.g., meeting a friend for drinks); although pleasant, the agreement might be of lesser perceived importance than the delightful prior event. In this context, failure of the other party to do as they had agreed, might be viewed differently than it would be in the absence of the prior event. Failure to keep the date might easily be perceived as being of lesser importance, it might be excused or diminished or not viewed as being a real failure to do as agreed, because of the greater perceived importance of the prior event (and perhaps, a happy mood). This is an exaggeration to make a point. It might be difficult to get participants to imagine a much-wanted marriage proposal, and although this is an everyday occurrence worldwide, it is not an 'everyday' event within most people's lives. Content that seemed as though it might overshadow the conditional agreement in this way, was not included within the opening scenarios for the first selection tasks; the cost-benefit distribution within the conditional agreement and card array were designed to represent the main costs and benefits within the scenario presented to participants in the selection task. The main stimuli to the targeted emotional responses within each condition, should perhaps be the costs and benefits that are represented within the conditional rules and card array items. The emotions elicited within-task are intended to be about the agreements that are depicted within the tasks. It seems highly unlikely that it would be possible to direct participants' emotional response to be only about the conditional agreement and subsequent behaviours, and not include other content from the opening scenario; the agreement and behaviours are given meaning and relevance within that opening context. However, the key focus of emotion within the new selection tasks was intended to be the conditional agreements and the subsequent behaviours that were depicted within the card array items.

Influencing the Intensity of Emotions

Emotion intensity is thought to be the result of several factors that we will consider briefly here (e.g., Frijda, 1986; Ortony, Clore & Collins, 1988). Emotions are thought to be elicited by ideas, objects, agents or events that are perceived to be real; events that seem to be less realistic will evoke emotions that are less intense, and

objects that are perceived to be not realistic might not then evoke emotion[19] (e.g., Frijda, 1986; Ortony, Clore & Collins, 1988). The association applies equally to happenings within the world, thoughts, and fantasies, and holds for all emotional responses. This positive association between perceived realism and emotional intensity has been used to explain why events that are distant from us, geographically or temporally, for example, *might* evoke weaker emotional responses than events that are in close physical or temporal proximity. Proximity is another factor that is thought to influence emotional intensity; object and events that are imminent, or close by, *can* be perceived to be more *real*, and so close proximity can give rise to more intense emotions. The degree to which an event is expected *might* also influence emotional intensity; more intense emotions might be evoked by unexpected events, although this factor interacts with the perceived importance of an event. Unexpected events that are of little importance should not evoke intense emotions. Although this next factor might be part of the emotional response, physiological arousal has also been positively associated with emotional intensity, (Ortony, Clore & Collins, 1988). More intense emotions are associated with higher levels of arousal, which ready us for active behavioural responses (such as fight, flight, or jubilant celebrations). If physiological arousal can be mimicked or induced by the content within the selection task, more intense emotional responses might therefore be evoked. The factors that have been considered up to this point, are thought to influence the intensity of all emotions. Ortony et al. (1988) argued that the intensity of a happy response depends upon the perceived desirability and importance of the causal object or event (the more desirable and important, the more intense the response). The intensity of anxiety evoked by a given object or event has been said (e.g., Epstein, 1973; Ortony et al., 1988) to be dependent upon the expected likelihood (probability, or certainty) that the feared event will occur, the subjective importance of what is threatened, and the degree to which the consequences are believed to be undesirable (the more probable, important and

19. Unrealistic expectations might evoke emotions, and so this way of thinking about emotions is not perfect. We might also be amused or horrified by something that seems odd, bizarre or unlikely. However, realism has been identified as being an important factor that influences the intensity of emotions.

undesirable, the more intense the response). Intensity of emotional response can also be affected by the degree to which an unfolding current event matches a memory of a past event (real or imagined) (Öhman, 2000; Ortony et al., 1988). Öhman (2000) argued that memories of anxiety-related events can trigger anxiety in the present if there is a sufficient match between a memory and the construal of the current event. The closer the match between an anxiety-related memory and the construal of a current event, the more probable and stronger will be the current anxiety response to an event. These intensity factors provided additional useful clues as to what kind of content might evoke emotions successfully within and between the *emotion-as-content* conditions across different versions of the new selection tasks.

4.2. Happy Emotion-as-Content

4.2.1. Antecedents, Aboutness and Behaviour

Being 'pleased about a desirable event' that has positive consequences for your goals, has been described as the key appraisal that defines 'joy' emotions (Ortony et al., 1988). Happiness is thought to result from the appraisal that something good has happened or is happening or I feel certain will happen – something that is experienced as being rewarding or is valued by me, and perhaps those I care about. Happiness might be evoked by the acquisition of something that is valued, or by a pleasurable experience, or by progress towards valued goals (Ellsworth & Smith, 1988; Frijda, 1986; Ortony et al., 1988). Happiness is thus a response to something that has happened, or that one feels certain will happen as a result of the occurrence of another event that creates this expectation. One's ability to cope with events seems to be high in happy states, and it has been argued that joy can arise in situations that are perceived to be not demanding of great effort (e.g., Lazarus 1991; Ortony et al., 1988). The feeling that we are in control of events, or in safe, familiar and secure settings has also been positioned as being an important

condition for the arousal of this emotion[20] (e.g., Izard, 1977). Some common sources of happiness have been identified as being positive social contact with friends, sexual activity, success or achievement in sports or hobbies or work settings, the performance of skilled behaviours (such as carving, or dance, or playing a musical instrument), the successful completion of valued tasks, being in nature, listening to music, food, drink and alcohol (e.g., Argyle & Martin, 1991). Happiness might involve a readiness to engage with attractive[21] ideas or activities, or places or people (e.g., Frijda, 1986). Positive emotions, happiness included, are thought to encourage play, and exploration, and the building and maintenance of social bonds (e.g., Fredrickson, 1988; Frijda, 1986; Izard, 1977). Much of this might be understood as the seeking of, or maintaining contact with, safety or reward. To allow investigation of the possible influence of happiness (and anxiety) on participant responses in the selection task, the way in which *participants*[22] might view the task content was considered when developing materials for each of the *emotion-as-content* conditions within the new selection tasks. Example sketches of the content that was developed for this *emotion-as-content* condition are presented in the three scenarios that are presented in the Figures three to nine below. These sketches provide examples of the thought processes that were involved, in the construction of concrete content for the new selection tasks. The construction process was guided by the elements of happiness that have been described above, and by the discussions that have been presented up to this point within the thesis.

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[20]. The question of what evokes joy, is more complex than presented here. Some people might enjoy feeling a little unsafe, but perhaps this occurs in situations in which they also feel safe, and that represent something familiar, or rewarding, or appetitive that is enjoyed.

[21]. Attractive in the sense of attracting pleasurable attention and engagement or being pleasing or offering pleasure.

[22]. The content was therefore designed to be relevant to the participants who were expected to complete the selection tasks within this research programme.

Opening Context

1. You've planned to go away for the weekend with friends, for a break
2. You've been working hard
3. and all of you are looking forward to getting away for time out to relax, escape work and have fun

Opening intended to position the event as desired, and near-future, social bonding, anticipation of a positive event, that is shared by good friends, building here to describing aspects of happiness, to set out the conditions in which happiness might be evoked

Avoid stating where they ae going, type of location, town, city, etc., or indicating the type of accommodation, etc., to avoid introducing factors that not representative of participants' experiences, or preferences, which might then fail as induction of 'happy'. These details might be 'filled-in' by participants using their experience… if prompt positive framing, hopefully will be happy experiences

Care needed not to introduce or focus on elements that might evoke a negative emotional response, such as anxiety (might depend on participants' experiences of holidays with friends, whether troublesome). Event positioned here as something that's good, a much needed break, 'much-needed' intended to signal greater desire for the event, increase value, and perhaps increase the intensity of the positive response (this is special treat).

An agreement was then needed that might sit realistically within this scenario. This might involve the friends mentioned in the scenario, and concern arrangements for the weekend or your time there. In this case, another actor was introduced into the setting.

4. Your uncle agrees to lend you his car for a weekend away

After constructing a scenario in which an agreement might be reached, it seemed possible that participants might infer that the uncle was being kind in lending his car – not a real contract. Include a lead up to the agreement within the opening context, present the conditional agreement as a social contract rather than a favour (which might then be forgotten), and so foreground obtained benefit and potential costs for the uncle

5. Your uncle has a car that hasn't been used much lately, because he hasn't been able to drive and so his car has been sat in his garage

This is intended to avoid the inference that his lending you his car will inconvenience your uncle too much, and can lead on to a reasonable exchange; agreement can then seem plausible. However, perhaps highlight a cost for uncle in the agreement to make explicit?

6. The car needs a good run to keep it in good working order, and it needs petrol.

Key: Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 3. Happiness scenario 1: Car loan and petrol exchange (a).

An explicit benefit here for the uncle, if the car is not taken out, that may cost him financially; you driving the car is therefore a benefit for him as it saves him having to take the car out on such a drive. Had positioned uncle as poorly or injured to explain why not driving, but that seemed in danger of spoiling happy condition, so removed. Lending you the car not merely an act of kindness. If participants have a generous uncle, who might say such a thing as an excuse that might allow them to accept his offer, they might not see this agreement as a social contract. Possible problem. Decided to test this on participants

Participant, via their perspective within the scenario, must also benefit from the agreements, and face a clear potential cost (or meet a realistic requirement?).

7. You have booked a weekend stay in a place that's hard to get to using public transport; his car would make the journey much easier and mean you don't have to struggle with heavy bags
8. It would be great to have car for weekend in case you want to explore when you are there

9. Your uncle knows about your weekend away – you get on well and have talked about it with him. He tells you about his car needing a good run, so you come to an agreement

Position the car loan as something that would remove possible negative elements of the break, and heighten the benefit of borrowing the car. Ease of travel is positioned to evoke feelings of relaxation and joy. Introduces a hassle but removes it, hopefully. *Present additional benefits of the car, providing associations of freedom and exploring? Will hopefully build on the conditions that might evoke happiness*.

9 provides a bridge between the preceding content and social contract, and provides a realistic setting in which the agreement might be made. Private social contract, between niece and uncle, different authority/ social roles, mutual exchange?

If you fill his car with petrol, (p)
he will lend you his car for your weekend away (q)

The social contract for this agreement might be mapped out as follows:

Uncle lends you his car for the weekend	Cost: U	Benefit: Y
You fill it with petrol, clean it the day before you set off	Cost: Y	Benefit: U
Easy journey, avoid struggling with luggage	Benefit: Y	
Car needs a good run	Benefit: U	
Possible problem: Not explicitly referenced but might occur		
Uncle/ You might fear damage to the car whilst on loan	Cost: Y and U	

Key: U = Uncle, Y = You, italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 4. Happiness scenario 1: Car loan and petrol exchange (b).

Opening Context

1. You have been dating someone for a few months who you like a lot, you have enjoyed being with them, you want find a way of having some time alone with them

Opens with attempt to evoke the excitement involved in early stages of dating, which is going well, avoid references to gender or sex of partners, to avoid introducing elements that don't represent participants' preferences and spoil targeted emotional response. Provides a key goal and a desired positive event

4. which has been impossible before now because there have been friends around when you've been together

In this way, the goal isn't something that has been easy to organize before now, and so achieving this might require a little effort, offers attractive benefit in return for effort, seems that you might be willing to make a little effort to achieve, sets ground for contract

5. You'd really like to have some space alone with them without interruptions so that you can relax, and enjoy an evening together

Repetition to foreground and increase focus on the desire to achieve this goal, and anticipation of a positive event. Emphasize attractiveness of goal, gently, without bluntness. Building to elements of happiness, leaving out specific details of what you might do together to avoid arousal of emotions not wanted in this condition: don't insert anything that might jar, or offend, or embarrass. Leave room for ambiguity, and for participants to fill in these details from their desires and experiences. A way of achieving this goal can now be introduced, that can here take the form of a social contract, one that might sit realistically within this scenario; might involve the friends mentioned in the scenario, and concern arrangements for the weekend or your time there. In this case, another actor was introduced into the setting.

6. You live in a shared flat, and it hasn't been possible to have time alone there

Introduce obstacle to the goal, helps to position agreed solution to this as desirable, take care not to emphasize or linger on the negative aspects of this, to minimize the probability of evoking unwanted emotional responses in this condition. Foreground desire if possible.

7. You and your flatmate come to an agreement to give each other the use of the flat on different evenings

You'll give them the flat for the night, (*p*)
if they'll do the same for you (*q*)

Solution that might work for both parties, and function effectively as a social contract?

Key: Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 5. Happiness scenario 2: Shared flat -- Room exchange (a).

Contract should include benefit for flatmate in account? to avoid speculation about whether the flatmate would do that, why they had agreed: might arise, particularly if participants have attempted a similar exchange within relationship that not always good. If a plausible, realistic benefit and cost to the flatmate can be established within the agreement, easier for participants to construe the contract as being one that there is good reason to comply with, for both parties. Foreground costs and benefits that want participants to represent.

7. Your flatmate likes to spend their evenings in the flat, they haven't got much money this semester and it's cheaper for them to socialise at home

8. They also really prefer to relax in a familiar environment where they feel at home either alone or with a few close friends. However, they're not comfortable around people they don't really know, and they don't know your date at all

Establish that their leaving the flat for the evening is a cost to them, provides a familiar, plausible rationale their preference. Reinforces that leaving the flat for you, will be a cost for them – perhaps a little too much focus on that here for the happy condition?
This addition provides a benefit for flatmate if they leave? which not obvious within the preceding content, and mitigates against possible inferences that they would not come to such an agreement? Test this with participants.

The participant must also face a clear potential cost within the agreement, or perhaps satisfy a qualifying condition for the benefit?

9. You were looking forward to an early night this evening
10. but your flatmate knows that you want to invite your date over on Friday evening
11. They'd really like the flat to themselves this evening – they don't know you very well as you haven't been sharing long, and they'd like to have a relaxing night in with a few close friends

Includes a specified cost to you within exchange, provides a plausible rationale for the timing and nature of the agreed exchange? foregrounds your goal again, the benefit gained by entering the agreement. Positions your remaining in the flat as a cost to them that they would rather avoid, and provides the bridge from context to agreement

12. So, you two come to an agreement

If you let your flatmate have the flat to themselves this evening (*p*)
they will let you have the flat to yourself on Friday evening (*q*)

13. You can invite your date over to the flat this Friday evening, and you're feeling excited about the prospect of having the place to yourself with them

Key: Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 6. Happiness scenario 2: Shared flat - Room exchange (b).

The additional content after the agreement is intended to focus back on desired benefit, heighten the anticipation of a positive event, and thus increase probability of evoking the desired emotional response. Addition after the contract not used in previous published selection tasks. Private social contract, between friends, similar social roles, mutual exchange.

The social contract (cost-benefit) for this agreement might be mapped out as follows:

Flatmate lets you have flat for the evening	Cost: FM	Benefit: Y
You let them have the flat for evening on a different date	Cost: Y	Benefit: FM
You want to bring a date home, have the place to yourself	Benefit: Y	

Key: FM = Flatmate, Y = You. Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 7. Happiness scenario 2: Shared flat - Room exchange (c).

Opening Context

1. You have a part-time job, which you've been doing to get some extra money.
2. It's good fun most days, the work is enjoyable, and your manager is very reasonable. The pay is good too.

Work, but position as a benefit. Build on this to foreground its positive consequences. Focus on the positives. Retain realistic nature of the setting, but take care not to foreground aspects that might evoke unwanted emotions (costs, dislikes). Highlight multiple aspects of the setting that are valued, make stimuli that might evoke happiness salient

3. You have become friends with some of the people you work with and so the time that you are there passes pleasantly enough

A little drop in happiness threatened… too much focus on work? Moving towards a situation in which an agreement might emerge, whilst highlighting positives within setting

4. The job is easy to get to, and so you don't have hassle travelling to and from work.

Again, attempting to build in positives, but is this just drawing attention to work again, and possible hassles rather than focusing on event that is enjoyed, desired, anticipated? Work not anticipated event here. Attempt to make positive a setting into which agreement would realistically fit, and again build positive focus within context). Should the word 'hassle' be included?? Represents, activates, draws attention to something that NOT desired. Test on participants.

Key: Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 8. Happiness scenario 3: Time off -Work shift exchange (a).

5. One of your work mates wants to go out when they're supposed to be working next week, and you' d like to change one of your shifts next week too, so that you can get to a party that you thought you wouldn't be able to get to.

Introduces a rationale for the agreement, provides motivation for both parties to enter into a genuine exchange. Benefits made explicit here for both parties, being able to do what desired, and avoiding cost of missing this if working when wanting to do something more pleasurable. Cost… working a different shift. Cost of those actions has been assumed rather than made explicit: job initially positioned for its benefits, but now might have associated cost. Problematic in this condition, possibly across conditions if these factors create differences. Test this on participants.

6. You'd really like to go to that, so it was a shame that you were supposed to be working when that was happening

Builds focus on benefits of the agreement and heighten focus on these in scenario, a desired goal that you thought had been blocked, provide conditions for intended emotional response?

7. When you're chatting during a work break, you arrange between yourselves to swap shifts, so that you can both get the time off you want next week

Provides bridge from the setting and rationale to the agreement. Private social contract, between friends, mutual exchange, similar social roles.

If you work their shift on Monday (p),
they'll work your shift on Tuesday (q)

The social contract (cost-benefit) for this agreement might be mapped out as follows:

You work Workmate's shift on Monday	Cost: Y	Benefit: WM
Workmate works your shift on Tuesday	Cost: WM	Benefit: Y
You go to party you want	Benefit: Y	
Workmate goes out on Monday	Benefit WM	

Key: FM = Flatmate, Y = You, WM = Workmate. Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 9. Happiness scenario 3: Time off - Work shift exchange (b).

4.3. Anxiety *Emotion-As-Content*

4.3.1. Antecedents, Aboutness and Behaviour

The key appraisal that has been associated with anxiety or fear, is that something bad, perhaps terrible, might happen; this appraisal can seem to lack a specific referent or object, or it might be attached to a specific thing or event (e.g., Öhman, 2000). Anxiety thus anticipates the occurrence of a bad event before it has occurred; it is about something that might happen (e.g., Ortony, Clore & Colins, 1988). The event that is feared might be about something that has happened, in which case what is feared might the possible consequences of that event. Common anxious felt behavioural impulses are said to be to escape or avoid a perceived threat (e.g., Lang, Bradley & Cuthbert, 1997), however, as discussed in the opening chapter, orienting towards threats and enhanced processing of threat-related stimuli might also be associated with anxiety. If the wish to escape can be evoked in by the content of selection task materials in the anxiogenic content condition, anxiety might be aroused. Some common sources, foci or causes of anxiety have been identified in previous research studies, by asking participants to describe experiences or situations or objects that made them feel anxiety or fear (see Arrindell, Pickersgill, Merckelbach, Ardon, & Cornet, 1991, for a review of these studies). Safety, security, survival (including losing control, travelling alone), health threats and interpersonal issues (e.g., fear of rejection, of inadequacy, being evaluated or criticized, or excluded, and interpersonal conflicts) were a key focus in participant reports.

The objects of fear and anxiety (what one is anxious about) are perceived threats to something or someone that we value or care about. These threats might endanger or damage something valued that we have or prevent us from gaining something of value (e.g., goal achievement, personal relationships, social status, academic success, employment). It has been argued that we feel anxious about such threats when we are uncertain of our ability to avoid a feared outcome, or to cope effectively with them, and when there is no construal that someone or something is responsible for or to blame for the threat (e.g., Epstein, 1973; Frijda, 1988; Ortony,

Clore & Collins, 1988; Smith & Lazarus, 1993). A state of uncertainty, feeling unsafe and not in control of events have thus been positioned as being important conditions for the arousal of anxiety. In an anxious state we are primed to expect the presence of threatening objects or events, and their occurrence might seem more probable than when we are in positive or neutral states (e.g., Öhman, 2000)., Anxiety might be associated with a focus on *and or* avoidance of potential threats, and any associated negative consequences, in an attempt to establish the existence of threats, or protect ourselves, beliefs, values, objects, or others that we care about, from harm (Frijda, Kuipers, ter Schure, 1989). The avoidance of threat might be achieved via physical or mental acts; we can put physical distance or barriers (such as doors), or mental barriers (e.g., by not thinking about, or looking at, or engaging with a source of threat) between ourselves and perceived threats. We might also behave in a submissive, unimposing manner in an attempt to prevent a feared attack. Anxiety about a possible threat might result in increased engagement with the perceived threat, to determine whether our initial fears are confirmed or unfounded.

Example sketches of the content that was developed for the anxiogenic emotion-as-content condition are presented in the three scenarios that are presented in the Figures below (Figures 10 – 15). These provide examples of the thought processes that were involved, in the construction of concrete content for the new selection tasks. The construction process was guided by the elements of anxiety that have been described above, and by the discussions that have been presented up to this point within this thesis.

Opening Context

1. The past few months have been a bit tense
2. One of the things that has contributed to this is that you've been struggling with one of your modules at university
3. although other things have felt more difficult too

Positions potential for anxiety at very beginning of this scene, 'tension', 'struggling', 'difficult' can be elements of anxiety; inclusion foregrounds these elements. Multiple things difficult – multiple demands on you, increased load to cope with, and widening the sense of struggling. Creating what might be the conditions for anxiety.

4. You have attended all the lectures for that module, and you've been going through the work with some of your course mates who seem to understand it better than you do
5. That has helped you to understand the work better than you did when studying alone. You've found some books that help too; the way that they've been written makes it easier to understand the things that are included in the module

Inclusion of these elements to avoid inference that the situation is completely hopeless (might induce e.g., apathy, sadness, despair), presents efforts to cope and some positive effects of this, perhaps alleviating a little cause for anxiety? Foregrounds comparison with others – is this problematic? Possible trigger for anxiety, justification for response? Want content to seem realistic, and plausible to participants. Test on participants to see what their response to content is.

6. The rest of your course seems to be going well; you've been getting good grades in most of your work and so you're reasonably happy about that
7. You are concerned about this module though - the module is double-weighted
8. you don't want a poor grade in this module to drag down your overall mark for the year

Avoids inclusion of explicit 'grade', to allow participant inference of what good or bad, for them and not insert wrong note. Question inclusion of reassuring content that other work going well – avoid despair, but is this too comforting, reducing concern. Switch back to focus on concern for module – foreground uncertainty and importance of grade, increase the import of cause for concern, which needed in this condition. Building conditions for anxiety, introduction of potentially negative outcome of what anxious about on a valued goal, to heighten probability of anxiety response.

An agreement needed that might sit realistically within this scenario. This might involve actors mentioned within the scenario, or another might be introduced.

Key: Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 10. Anxiogenic scenario 1: Working hours and module grades (a).

Participant must benefit from the agreement, and clear potential cost must be included (or requirement met?) within the conditional. Might seem strange to shift the focus to a subject other than the module at this stage, although that could be achieved. A rationale for the social exchange contract that links the agreement to the preceding scenario, would allow the scenario to unfold in a plausible manner.

9. So you arrange a meeting with the module tutor to talk about what you can do to pick up your grade
10. You explain to them what work you've been doing and how you're feeling about the course
11. Your tutor tells you that there is a simple rule that you can follow when planning your work schedule

Introduction of tutor retains the focus of anxiety on the topic that has been key within this scenario, allows building on within conditional and array. The tutor provides opportunity for introduction of a plausible conditional rule, provides a rationale for this, and a bridge from the scenario to the conditional.

Avoidance of gender terms and names, intended to avoid inclusion of specific details that might detract from unfolding of events within scenario (associations with, objections to that don't fit in this condition), keep focus of this scenario and rule; attempt to minimise stimuli that might spoil emotion-as-content condition.

If you put in the required work for the module (*p*),
Your mark for this module won't pull down your overall mark for the year (*q*)

Will 'q' seem plausible to participants? Sounds as though realistic content, avoids cliché such as 'you'll be fine' or you'll do well in this module'? which might annoy. Leaves more room for interpretation to fit with experience, and for things to be okay? This isn't an exchange between friends, difference in authority between the two actors, benefit and cost for participant, but not for tutor – presents a unilateral cheating option. Is this a problem? Seems more like a promise than a private social exchange contract. Does this matter?

The social contract (cost-benefit) for this agreement might be mapped out as follows:

You put in the work required for module	Cost: Y
Your mark for this module doesn't pull down your overall mark for the year	Benefit: Y (and T???)
Tutor's time marking (implicit, not in this scenario, unconvincing, too far a reach?)	Cost: T ???

Key: T = Tutor, Y = You. Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 11. Anxiogenic scenario 1: Working hours and module grades (b).

Opening Context

1. Your exam results are being released later today; you seem to have been waiting for these for ages
2. You're not sure how you did in these last exams
3. The questions were a bit tricky and you're not sure that you answered the questions properly

Opening with the feared event, and long anticipation of this, immediate foregrounding of uncertainty and anxiety antecedent, present a sense of ongoing tension. Heighten the sense of uncertainty – the paper might have been a hard one, the outcome is uncertain

4. You've heard other people talking about the exam questions, and they seem to have given different answers than you

Include frequent, familiar behaviour amongst students, this might heighten your sense of uncertainty about the results, build upon this towards the agreement, the situation is one in which you cannot exert any further control over the outcome.

5. You thought that your answers were okay, so perhaps the grades will be fine, but you ran out of time in most of the exams, and couldn't remember everything that you wanted to include

Foregrounding uncertainty further, thoughts going over about this concern as to the outcome, familiar to students, 'okay' perhaps lessening anxiety conditions, but moderation might increase the probability of anxiety rather than apathy or despair evoked here

6. You've been up for hours, because you couldn't sleep last night, and now you're feeling a bit tired
7. You had arranged to get something to eat with a friend, before the results come out, but you're not hungry now
8. It's hard to sit still, or to focus on other things, but you're hoping that you'll feel better when you know what marks you got this semester

Present aspects of anxiety (trouble sleeping, tiredness, restlessness, pulling out of agreed meeting with friend), and so heighten that sense of worry, or present conditions in which anxiety might occur, thus providing appropriate stimuli to an anxious response. Content focused on building sense of tension and uncertainty and concern about results.

9. Your parents have been on the phone to you this morning, wanting to know when you'll get the results
10. This has made you feel more tense than you were already

Key: Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 12. Anxiogenic scenario 2: Exam results and a holiday (a).

Introduces a new party, with whom you might form an agreement, but does so in a way that might serve to heighten anxiety; introduces their possible reactions to your results into the scenario. Brings focus back to the conditions for or characteristics of anxiety. Introduction of parents provides opportunity for a social contract in this setting,

11. As a surprise, your parents have decided to pay for a holiday for you if you do well in the exams

12. When they rang this morning, they told you that

Provides a rationale for the conditional, although introduces a positive, does this near the end of the opening context, without hopefully undermining the conditions set for anxiety. Creates a plausible bridge to the conditional, is this realistic for many participants? Will it generalize? Not sure. Test on participants.

If you get your predicted grades in the exams (p),
they will pay for you to go on holiday next month (p)

Benefit for parents is implicit here too. We might infer cost-benefit for them from assumptions about this relationship, but would be wrong to do so: these were made explicit in other scenarios to minimize this problem and provide participants with costs and benefits for parents. Agreement might seem like a reward for you, with no obvious benefit for them (benefit for you, cost for parents). Creates a difference between conditions. Parents' cost-benefit should be explicitly stated. Payment for holiday might not seem realistic for some participants, might evoke feelings not targeted here (longing, jealousy, irritation, sadness). Not an agreement between friends, difference in authority and relationship. Again, seems more like a promise than a social exchange contract. A Difficulty? Benefit here should evoke happiness, so not an avoidance of a negative outcome as in scenario one. p is an avoidance of a negative outcome for participant, this contract takes place after that event, is this a problem?... Highest concern might be on not-p, which is a clear potential cost for participant. Costs and benefits seem to be wrongly placed in this version – realized retrospectively after testing. Two Costs: Poor grades and no holiday.

The social contract (cost-benefit) for this agreement might be mapped out as follows:

You get the predicted grades in your exams	Benefit: Y	(and P??? unclear)
Your parents pay for you to go on holiday next month	Benefit: Y	Cost: P
You not getting your predicted grades (*not-p*)	Cost: Y	(and P? unclear)

Key: P = Parents, Y = You. Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 13. Anxiogenic scenario one: Exam results and a holiday (b).

Opening Context

1. You have been out all day, and you are feeling tired; you want to get home and get to bed
2. The day has passed too quickly, and you didn't manage to finish everything that you wanted to get done
3. You've had to deal with a lot of interruptions from other people who wanted your help or advice, and you've perhaps been too generous with your time

Opening with a situation that you wish to end, or get away from, and a sense of weariness, not functioning at your best, not clear what you've been doing, might this create conditions for anxiety? M*oving away from a sense of low arousal at start, to foreground a sense of being hassled, rushed, a faster pace, and not achieving your goals, not quite in control, intended to build tension*.

4. It's late in the evening, it's dark, and it's raining outside
5. You're dressed for the weather, but you're not going to get home without getting wet.
6. You don't have money for either a taxi or bus home, and you can't get a lift back this evening

Focus on discomfort, an unsettled state, begin to shift focus towards the rationale for the conditional agreement, the setting is uninviting, one that might evoke unease, ruling out easier routes home, where you want to reach

7. You're going to have to walk home, and you'll have to go through an old, rundown estate, which you've only done twice before when it was light

Might create conditions for dread, something that not looking forward to, sense of unease, an unwelcome task, one that contains uncertainty, and will need effort to cope with

8. You set off in the rain. Visibility is quite poor because of the rain
7. You can hear shouting in the distance – probably people who've been out drinking for the night who are on their way home
9. You can hear footsteps behind you too, but you can't see who they belong to

Building conditions for unease, uncertainty what happening close by, possible threats, restricted view of what happening, creating conditions in which anxiety might occur. *Evoke features of setting that might create a sense of realism, of being there. creating a sense of uncertainty, immediacy, you might not be in control of events.*

10. You're approaching the old estate, and don't feel keen to make the journey through that alone

Key: Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 14. Anxiogenic scenario 3: Walking home with a friend (a).

Building tension, a sense of immediacy, focus on source of anxiety and setting up the benefit for you within the coming agreement.

11. There's a bus stop on your left, before the start of the estate, and you stop here to wait for a friend
12. They have been out for the evening and have agreed to meet you here where they'll get off the bus, so that you can walk home together

Introducing the other party, and the agreement here, earlier than in other scenarios, might be a problem? Still within scenario. This agreement was made earlier, but you're just learning about it now, seems odd, not realistic in circumstances, probably wouldn't forget in light of the situation that's been unfolding. Does this deflate the heightening conditions for anxiety? Content provides a setting for the agreement, and a rationale for why you might meet here within the agreement.

13. They live very near to you, and they didn't want to walk home alone at this time of the night. They'll have to come home a bit earlier than planned, but they were pleased that you would be walking home that way this evening.
14. When you spoke earlier today, you had come to the following agreement

Clearer setting out of costs-benefit for the friend; their motivation to form and adhere to the agreement, so that this is seen as being a firm commitment between friends. This content provides a bridge b*etween the setting and the conditional agreement that was started in 11 and 12.*

If you wait for them at the bus stop just before the old estate (p),
they will meet you there and walk back home with you this evening (q)

A private social exchange contract, between friends, similar social roles, costs and benefits for both? Or are costs for 'you' unclear? They might be. Waiting at the bus stop seems preferable to continuing alone in rain, which was positioned as the alternative, this then might be regarded as a benefit for 'you'. Walking to waiting at a bus stop in the dark intended to be cost for you, Overshadowed by previous content? Possibly, seems unclear.

The social contract (cost-benefit) for this agreement might be mapped out as follows:

You wait at the bus stop for your friend	Benefit: F	(and Y? unclear)
Friend meets you a bus stop and walks home with you	Benefit: Y	
Friend must come home early to be at bus stop	Cost: F	

Key: F = Friend, Y = You. Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 15. Anxiogenic scenario 3: Walking home with a friend (b).

4.4. A Neutral or Low Emotion-as-Content Condition?

4.4.1. Antecedents, Aboutness and Behaviour

Emotions have been conceptualized as being dynamic, multifactorial responses to objects, thoughts, agents, or events that might affect or have affected us in some way. It initially seemed right, then, that the materials constructed for the neutral *emotion-as-content* condition should contain content that seemed likely to have no value, importance, attraction or repulsion for participants. As emotions might be evoked by high levels of uncertainty, and by feeling safe and secure, it seemed important that these situational features should not be made salient, represented or pointed to within the neutral emotion-as-condition. As the behaviour of others that is appraised as being unfair, blameworthy, or ridiculous might also give rise to emotions, it seemed important to exclude such factors from this condition if possible. It seems that the content developed for the no-emotion content, would need to be perceived to be of little personal or real importance by task participants. An obvious strategy that might be used to develop materials that evoked no emotion, would be to reduce the perceived realism of the scenarios, conditionals and subsequent behaviours depicted within the card array items. However, for the neutral content condition to function as a robust control for the effects of happiness and anxiety on task performance, all other factors that have been identified and controlled would need to be held as constant as possible across all conditions. As discussed in chapter two, realism was identified as one the key factors that altered participant behaviour in previous versions of the selection task. Reducing realism in the neutral condition would make it impossible to determine whether this factor, rather than the difference in emotion between conditions, was the cause of any differences or lack of differences in card selection patterns between conditions. This strategy was therefore not adopted here.

A further complication became apparent in the attempt to construct a neutral *emotion-as-content* condition for this task. One of the challenges faced in the construction of the *emotion-as-content* conditions, was the need to include a social contract cost-benefit distribution within the conditional agreement (e.g., Cosmides,

1989; Gigerenzer & Hug, 1992), at least in the first versions of the new selection tasks. Within the conditional agreement, two parties would agree to do something that involved a cost to each of them, or met a precondition, but provided a benefit for the other party, in order to obtain a benefit for themselves. The conditionals used in the new tasks would be pragmatic, everyday social agreements (as discussed in chapter two). Within these parameters, it would be necessary to construct neutral *emotion-as-content* scenarios in which participants would care sufficiently about the agreement, and one party not behaving as they had agreed to, without that evoking an emotional response. As I have argued in the previous chapter, in the 'neutral' condition, participants would have to *care* a little about the agreement, for the costs and benefits to function *as* real costs and benefits, and the agreement and the behaviours post agreement to then matter, but they must not care too much. At this point, whether it would be possible to construct a neutral *emotion-as-content* condition for the new tasks seemed to be in question. Between this condition, and the happy and anxious conditions, all other factors that had been highlighted as being important influences on behaviour in previous selection tasks, would need to be held constant, or as constant as possible within the different situations that would be depicted within each of the *emotion-as-content* conditions. However, it seems likely that the cost-benefit content contained within the happy and anxious content conditions, might need to be of greater perceived value or importance than the cost-benefit contained within the neutral emotion as content condition. The use of costs and benefits that were of mild import might create in a neutral content condition. This would result in a difference between the *emotion-as-content* conditions, in the perceived importance of the costs and benefits that were situated within conditionals. However, it might not be possible to separate, what are designed to be realistic costs and benefits, from emotion within these first versions of the new selection task. The construction of the three scenarios that are presented below, was guided by the elements described above, and by those that have been detailed for the construction of happy and anxious *emotion-as-content* conditions.

The key difficulty faced at this time in the construction of scenarios for the neutral *emotion-as-content* conditions, was the task of creating scenarios that contained the cost-benefit distribution required for a social contract, and also seemed likely to evoke little or no emotional response. The settings and conditionals in these conditions could not include events or behaviours that would be of significance or importance to participants. They must, however, contain plausible, social contracts or everyday agreements that would be seen as being binding by participants (e.g., Over & Manktelow, 2012). Example sketches of the scenarios that were developed for the neutral *emotion-as-content* condition, are presented in the three scenarios that are presented below (in Figures 16 to 19). As for the other *emotion-as-content* conditions, these sketches provide examples of the thought processes that were involved, in the construction of concrete content for the new selection tasks. The construction process was guided by the factors discussed above, and by the discussions that have been presented up to this point within the thesis.

Opening Context

1. You've moved in to a shared house, with three friends
2. The rent is reasonable, the house is close to university and the local shops, and so it will be convenient living here
3. You haven't lived together before, but you get on with each other, and you hope you'll get on as housemates

Opens with an event that has happened, might be mildly pleasant, or okay, you're with friends, convenience and reasonableness are foregrounded, hopefully doesn't include anything that will signal anything of great value or importance. Attempt to emphasize the mundane. Ordinary, moderate, unremarkable, mundane benefits, hopefully, use of terms such as 'reasonable' and 'convenient' will help to create these conditions.

4. The rooms are clean, and you all have rooms that you wanted when moving in
5. You have a rota for house chores, and you take turns with these so that the system is fair

Setting includes some potential positives and negatives, but hopefully mild, and of little importance. Limit other events or behaviours, want to avoid triggers to emotion, terms are intended to 'dampen down' the atmosphere, focus on daily, mundane details. Attempt not to emphasise or highlight any factors that might be seen as particularly positive or negative. Content, provides an everyday setting in which a plausible social contract might be made

Figure 16. Neutral scenario 1: Turn taking with house chores (a).

6. You're going to be away for a week next month, and so you won't be able to do your chores that week
7. You don't feel as though you can leave your friends to do them for you, and don't want to cause friction in the house

Avoid detailing reasons for being away, so that it could be work or play, so that the context does not build into one that might evoke a specific emotional response. Provides opportunity and rationale for the agreement, and sets out possible benefits and costs associated with this, attempting to create a scenario in which the agreement might matter to participants in light of the relationships and living arrangements, without it being too significant. Question use of the word 'friction' and reference to this possibility… a mistake? Inclusion of this points to this as possible event, might evoke memories of friction between friends, housemates, and the accompanying emotions for those events.

8. So, you ask one of your friends if they'll do your chores for you when you're away, if you do something in return for them
9. They're not keen on housework

Presents a plausible, reasonable social exchange? Introduces a preference, but does so briefly, and hopefully in a way that softens emphasis on this, or attempts to soften (vs. e.g., they really dislike housework… indicating a stronger preference on their part).

10. so they suggest that you can swap chores on the rota, so that they don't have to do any more than they do already
11. You come to the following agreement

Hopefully this brings the content back to mundane ground, away from building to strong feelings, and bridges to the agreement.

If I do you all of your chores next week (p),
You'll do all of my chores for the week when I'm away (q)

A private social exchange contract, between friends, similar social roles, costs and benefits laid out for both parties, content hopefully provides clear costs and benefits for both parties – hopefully not-p here for 'you' is not too strong a condition for anxiety? 'You' thinks not-q here might lead to friction. Consider after testing on participants.

The social contract (cost-benefit) for this agreement might be mapped out as follows:

You do all of your friend's chores next week	Benefit: F	Cost: Y
Friend does all of your chores for the week when you're away	Benefit: Y	Cost: F

Key: F = Friend, Y = You. Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 17. Neutral scenario 1: Turn taking with house chores (b).

Opening Context

1. You are living in shared accommodation and you have some milk in your fridge.
2. It is late evening, and this is the only milk in your house.
3. Some friends have called in after a night out and want to use your milk to make drinks.

Presents a plausible, mundane opening setting, hopefully avoids reference to anything that might seems particularly important. A focus on mundane details, avoiding type of milk, or any detail that might not be in line with participant preferences.

4. You don't have enough milk for breakfast anyway, before they use the milk
5. and you were going to buy some in the morning

Introduces a scarce resource, and a need, but does so briefly, without amplifying the situation. Keeps the content focused on mundane details, provides a rationale for the exchange and provides a bridge to the agreement.

6. To save you from needing to do this, you come to an agreement with them:

If they use your milk this evening (p),
they must replace it early tomorrow morning, with a full bottle/carton of milk, so that you have milk for your breakfast (q)

A private social exchange contract, between friends, similar social roles, costs and benefits laid out for both parties, content provides costs and benefits for both parties.

The social contract (cost-benefit) for this agreement might be mapped out as follows:

They use your milk this evening	Benefit: F	Cost: Y
They replace your milk early tomorrow morning	Benefit: Y	Cost: F

Key: F = Friend, Y = You. Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 18. Neutral scenario 2: Milk loan and return.

Opening Context

1. You are living in shared accommodation with friends,
2. and you and a friend have run out of food;
3. you are going to get a lift to the shop to get some new supplies

Presents a plausible, mundane opening setting that should feel familiar for participants. Focus on mundane details without naming anything in detail, to avoid clash with participant preferences (e.g., what car, shop, kinds of food).

4. Your friend wants to stay at home rather than go shopping this morning – they find shopping a bit of a chore
5. You were willing to get the shopping, but don't want to do all the work
6. You want to go out after getting home with the shopping.

Introduces a scenario that allows for an exchange of benefits and costs, does so briefly. Content is focused on mundane details, provides a rationale for the exchange, a plausible exchange, and provides a bridge to the agreement.

6. So, you come to an agreement:

If you get the shopping (p),
they must unload the shopping and put it away when you bring it home (q)

A private social exchange contract, between friends, similar social roles, costs and benefits laid out for both parties, content provides costs and benefits for both parties.

The social contract (cost-benefit) for this agreement might be mapped out as follows:

You get the shopping	Benefit: F	Cost: Y
They unload the shopping and put it away when you bring it home	Benefit: Y	Cost: F

Key: F = Friend, Y = You. Italic font presents notes and thoughts, ordinary font presents scenario content and conditional.

Figure 19. Neutral scenario 3: Shopping, unloading and putting away.

4.5. Assessment of The Selection Task Conditions.

To determine whether any of these nine versions of the *emotion-as-content* conditions might be good enough to use in the first selection task study, their

efficacy as emotion inductors was assessed in an empirical rating task. The purpose of this rating task was to determine whether any of the task versions might induce emotions, whether they might evoke the intended emotional responses, and whether they also might evoke emotions that were not wanted within the first selection task. The rating task was also used to guide further development of selection task materials; it was hoped that the participant ratings would provide some insight into what features of these materials might be effective stimuli to the targeted emotions, what difficulties were contained within them, and how these materials might be developed so that they would act as effective stimuli for the *emotion-as-content* conditions.

4.5.1. Method

4.5.1.1. Participants.

Twelve postgraduate students (male *N* = 5, mean age = 21.8, *SD* = 0.7; female *N* = 7, mean age = 22.57, *SD* = 1.29) from the School of Psychology at the University of Leeds, participated in the rating task.

4.5.1.2. Design and Measures.

The nine *emotion-as-content* versions that were shown in development in the sketches above (3 *happy*, 3 *anxious*, 3 *neutral*), were assessed on three dimensions: realism, familiarity, and emotional response (see Appendix 1 for the versions rated in this study). The first two factors were assessed using eleven-point rating scales (e.g., Kline, 2015), with zero representing *not at all realistic (familiar)*, and ten representing *extremely realistic (familiar)*. The realism dimension was intended to provide a measure of perceived realism, plausibility[23] and subjective probability. Familiarity was intended to provide a measure of frequency of occurrence (i.e., how often participants had encountered this kind of situation within first-hand experiences or via the accounts of others). Realism and familiarity were assessed using the following questions:

[23] Realism and plausibility were separated in future rating tasks.

> Realism*: Using your own experience as a guide*, *how realistic is the situation described*? *Realistic here means that you have had a similar experience, or can imagine the described events happening to yourself, your friends or to others.*
>
> Familiarity: *Using your own experience as a guide, how familiar is the situation described? Familiarity here refers to how often you have experienced or heard about something similar to the situation described, from friends, family or others.*

Emotional responses were assessed using eleven-point rating scales for *happy*, *amused*, *excited*, *anxious*, *worried, nervous, angry*, *irritated, sad*, *embarrassed*, *uncomfortable*, and *bored*[24], with zero representing *not at all*, and ten representing *extremely*. These twelve dimensions were used to provide a measure of whether the targeted emotions were felt whilst participants were reading through each of the scenarios, and a measure of other possible emotions that might have been felt whilst reading through them. For this element of the rating task, participants were instructed to:

> *Indicate which of the following emotions you felt whilst reading this scenario. In the 'intensity' box positioned alongside each of the listed emotions, please indicate how intensely you experienced that emotion by inserting a number from 0 to 10 (with* zero representing *not at all*, and ten representing *extremely). If you did not feel one or more of the listed emotions, please indicate that by placing a zero beside those emotions. If you did experience one or more of the listed emotions, please indicate the strength of those emotions by selecting the number that best represents this for each emotion*.

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[24]. Boredom has been categorized as an emotion by some researchers, and has not been categorized as an emotion by others (e.g., Alvardo, 1989; Izard, 1977; Johnson-Laird, & Oatley, 1989; Scherer, 1984; Shaver, Schwartz, Kirson & O'Connor, 1987). Although boredom has been included in the assessment of emotional responses to these materials, it need not be regarded as being an emotion. 'Boredom' was included to provide a measure of participant arousal, and engagement with the task and materials, rather than a measure emotion per se. It might be used as a proxy for neutral, if there were additional negative emotions reported alongside this response.

The list is not exhaustive; many other emotion terms might have been included in this measure to provide a more thorough assessment of what emotions might be evoked by these scenarios. However, it was felt that the act of working through too long a list of emotions might itself evoke an emotional response, that would then interfere with the reporting of emotions felt whilst reading through the scenarios. To provide a more thorough assessment of what emotions might be evoked to the scenarios, an additional measure of emotion was obtained using a free response category. It was hoped that this method would record additional, reportable emotions that were evoked by the materials, and not limit the emotional representation of scenarios to those that had been labelled within the rating scales. For this element of the rating task, participants were instructed to:

> *Describe any other emotions or feelings you experienced whilst reading through the scenarios in the boxes below, and use the intensity boxes to describe how strongly you felt these additional emotions or feelings*.

An additional free response question was included within the rating task. In this, participants were asked to report additional thoughts about the scenarios that had occurred whilst reading through them. It was hoped that the data obtained from this last question would provide a way of highlighting possible strengths and weaknesses of the materials for the task. The instructions for this element of the rating task were as follows:

> *Please use this section to report or describe any additional thoughts or feelings that occurred to you whilst reading through the materials, such as features that seemed odd or that were particularly effective or convincing.*

All participants were presented with the nine scenarios that were rated in this study. The nine scenarios and conditionals were presented in written booklet form; each scenario was printed on a separate page, and the rating scales were printed alongside each scenario on an adjacent page. Participants could thus see the scenario on the left-hand page, and the rating scales on the right-hand page, and so there was no page turning between reading of the scenario and the rating task. The printed presentation order of rating scales for realism and familiarity, was

counterbalanced between participants, as was the presentation order of emotion types, and scenarios within the emotion types.

4.5.1.3. Ethics

Ethical clearance for conduct of this study was obtained via the self-certification scheme from the Institute of Psychological Sciences Ethics Committee at the University of Leeds (Reference No. 08164-01). The design and conduct of this study adhered to the British Psychological Society's (BPS, 2014) code of Human research ethics.

4.5.1.4. Procedure.

Participants were recruited from within the postgraduate population, by asking them to participate in a rating task in which they would be asked to provide feedback on the realism, plausibility and emotional nature of nine scenarios that were intended to simulate realistic, everyday experiences. The rating task was completed within the School of Psychology at the University of Leeds. Participants completed the task in groups of four. Task instructions were read aloud to participants before the start of the rating task, to ensure that all participants understood these and how they should use the rating scales. Participants were then asked to read through the instructions before starting the task. The instructions read as flows

> Read through each of the scenarios in this booklet, one at a time, and answer the questions provided after each scenario. Please base your answers on *your* responses to the scenarios, without going back over the details included in the scenarios or thinking too deeply about your responses; report the first answers that come to mind.

At the end of the rating task, participants were told that the scenarios had been developed to evoke either happiness, anxiety or no real emotional response. Verbal feedback was obtained from participants after this debrief, on their experiences of the procedure, aspects of the scenarios that seemed to be most realistic (unrealistic), and their thoughts about the emotional nature of situations that had

been presented to them. This feedback was obtained in response to an open verbal prompt (i.e., *what did you think of the scenarios, and the task*?), which was used in an attempt not to cue participants to provide specific answers to this question.

4.5.2. Results

The purpose of this assessment was to evaluate the suitability of materials for use in the new selection task. Participant responses were, therefore, assessed for each of the scenarios rather than collapsing these within *emotion-as-content* conditions. Ratings for each of the scenarios were assessed by sex (i.e., male *vs*. female) in case there was a difference in emotional expression or reporting between sexes (e.g., Fischer, Kret, & Broekens, 2018; Fischer, Rodriguez Mosquera, Van Vianen, & Manstead, 2004). As this separation provided no significant differences between groups, the data here have been presented without this grouping.

Realism and Familiarity

Realism was operationalised as the degree to which participants could imagine the described events happening to themselves, their friends or to others, and answers to this question *using your own experience as a guide, how realistic is the situation described*? Familiarity was operationalised as how frequently participants had experienced or heard about something similar to the situation described, from friends, family or others, and answers to this question – *using your own experience as a guide, how realistic is the situation described*? Realism and familiarity were both estimated in numerical form (*0 = not at all realistic or familiar – 10 extremely realistic or familiar*). Summary descriptive statistics of these measures are presented in Table 5.

Realism

Scenarios in the *anxiety emotion-as-content* condition received the highest mean scores for realism, and variability in this dimension was lowest overall for these three anxiogenic scenarios. One of the neutral scenarios (house chores) received similar ratings, with a high mean and lower variability than was obtained for other scenarios in the neutral *emotion-as-content* condition. The work shift exchange

scenario within the *happy emotion-as-content* condition also received a similarly high mean and standard deviation for realism. Mean and variation were lower in the remaining two happy and two neutral conditions, although in the car loan and chore scenario, the results were also reasonable (means are high and variance is low).

Familiarity

One scenario in each of the *emotion-as-content* conditions obtained high mean familiarity ratings, with reasonably low variation in this measure (i.e., work shift, module grades, and house chores). In the remaining six scenarios, familiarity scores were lower and more variable; the variability in ratings here indicating that the scenarios were not reliably perceived as being familiar, everyday situations by these participants, despite being perceived as being realistic.

Table 5. Descriptive statistics for realism and familiarity by scenario and *emotion-as-content* condition (*N* = 12)

Emotion-as-Content Condition	Realism		Familiarity	
Scenario	*Mean*	*SD*	*Mean*	*SD*
Happiness				
Car Loan Petrol Exchange	8.08	1.11	3.08	1.11
Shared Flat Exchange	7.83	1.62	4.75	1.69
Work Shift Exchange	8.58	0.95	8.25	0.83
Anxiety				
Working Hours, Module Grades	9.25	0.72	8.33	1.03
Exam Results and a Holiday	9.00	0.91	6.67	2.39
Walking Home with a Friend	9.25	0.72	6.83	1.40
Neutral				
Turn Taking with House Chores	8.75	0.83	8.33	0.95
Milk Use and Return	8.25	1.42	7.50	1.42
Shopping, Unpacking, Putting Away	6.75	1.36	5.08	1.50

Key: 0 = Not at all realistic/ familiar; 10 = Highly Realistic/ Familiar

Reported Emotion Responses

Descriptive statistics of participant reported emotions that were felt whilst reading through the scenarios are presented in Table 6. None of the participants reported feeling any emotions that were not listed within the adjectives that had been provided for rating emotional responses to the scenarios.

Neutral Emotion-as-Content Three fairly low intensity emotional responses were reported in response to scenarios constructed for the neutral *emotion-as-content* condition; happiness (in response to all 3), irritation (in response to 2), and boredom (in response to all 3). The third scenario (unpacking groceries) obtained the lowest intensity ratings for all participants except one, who reported high levels of excitement and happiness at the prospect of going out after doing the shopping. Responses to the remaining two neutral conditions were variable, with participants reporting feeling mildly happy with arrangements, or mildly irritated and bored by 'tedious' details. Although the Milk Loan and Return scenario seemed to provide the least problematic ratings within the neutral *emotion-as-content* condition, this scenario attracted the most negative verbal reports from participants after the task, who reported feeling irritated by the tedious nature of the content depicted within the scenario. Although the emotions that were reported for these scenarios were of low intensity, none of these scenarios succeeded in evoking no emotional responses from participants.

Anxiogenic Emotion-as-Content The two scenarios that contained references to exams were effective stimuli to anxious responses; all twelve participants reported reasonably high levels of anxiety whilst reading these two scenarios (responses ranged from moderately anxious to extremely anxious). The module tutor scenario evoked the most anxiety. However, the module tutor's behaviour evoked moderate levels of irritation in six participants, and low levels of irritation in another two. In the second exam scenario, the promise of a holiday evoked high levels of happiness in three participants, moderate levels of happiness in three participants, and low levels of happiness in another two. In both exam-related scenarios, however, participants reported that their most dominant feelings were related to anxiety. The walking home at night scenario in this condition functioned less effectively.

Table 6. Descriptive statistics for reported emotional response by *emotion-as-content* condition and scenario (*N* = 12).

	Happiness						*Anxiety*						*Neutral*					
	1		*2*		*3*		*1*		*2*		*3*		*1*		*2*		*3*	
Emotion	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Anxious	0.92	1.80	0.17	0.55	.	.	7.67	1.43	7.83	1.14	1.83	3.29	.	.	.	.	.	.
Worried	1.75	2.31	.	.	.	.	8.17	1.07	6.42	2.60	0.42	1.38	.	.	.	.	.	.
Nervous	.	.	0.83	1.91	.	.	8.08	1.38	8.00	0.91	4.08	2.72	.	.	.	.	.	.
Angry	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Irritated	.	.	1.83	1.99	.	.	3.67	3.09	.	.	2.25	2.62	.	.	0.67	1.25	0.17	0.55
Embarrassed	0.33	1.11	0.50	1.19	.	.	0.42	1.38	.	.	.	.	.	.	.	.	.	.
Uncomfortable	.	.	1.75	2.28	.	.	.	.	.	.	0.83	2.03	.	.	.	.	.	.
Sad	0.33	1.11	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Bored	1.58	1.55	.	.	.	.	.	.	.	.	.	.	1.08	1.38	2.00	2.42	1.42	1.19
Happy	5.17	1.99	4.67	3.01	6.08	1.66	.	.	3.92	3.12	2.00	1.83	3.33	1.70	1.00	1.47	2.50	1.94
Amused	.	.	5.42	2.93	–	.	.	.			.	.	.	.	.	.	.	.
Excited	4.67	2.75	.	.	5.08	1.71	.	.	0.33	1.11	.	.	.	.	.	.	.	.

Key: 0 = No Emotion, 10 = Intense Emotion. Scenarios: Happiness: 1: Car Loan-Petrol; 2: Shared Flat-Room; 3: Work Shift Exchange. Anxiety: 1: Working Hours-Module Grades; 2: Exam Results-Holiday; 3: Walking Home with a Friend. Neutral: 1: Turn Taking-House Chores; 2: Milk Loan; 3: Shopping, Unpacking-Putting Away.

Although two participants reported feelings of intense anxiety when reading this scenario, the remaining ten participants reported moderate levels of irritation and happiness; both directed towards the friend who they had arranged to meet, and the fact that they had made the arrangement which would alleviate any worries they might have had walking home. This conditional thus evoked happiness.

Happiness Emotion-as-Content The work-shift exchange scenario seemed to evoke the most consistent, condition appropriate responses in this task. Only two emotions were reported in response to this scenario – happiness and excitement, at moderate levels of intensity for most participants (achieving low scores from two participants, and high scores from another two). The car loan scenario received low happiness/ excitement scores from five out of 12 participants, and moderate to high levels of these emotions from the remaining seven participants. Responses to this were therefore mixed. Six participants also reported feelings of anxiety in this scenario, which were focused on possible damage to the car, and being away with people that you might want to get away from. Responses to the flat share-room exchange scenario were also mixed; high levels of happiness or excitement were reported by six participants, however, nine participants reported feelings of anxiety, and embarrassment due to the subject matter presented in this scenario, and or irritation with the flatmate.

Additional Comments

This section contains comments that were made by participants in the additional comments section of the rating task (a summary of these is presented in Table 7). In these comments, participants provided feedback on aspects of the scenarios that seemed to make them more odd or less convincing. Use of a short introduction to the conditional at the close of the opening context, and a conditional that could realistically come out of some aspect of that context, seemed to function most effectively in the creation of the intended emotional response. Too much focus on details of the conditional, or on aspects of the setting that provided a rationale for the conditional, seemed to spoil the intended emotional nature of the scenarios. The content that seemed to be most effective stimuli to anxiety, were details of the

Table 7. Additional comments: Effectiveness of stimuli to emotional responses.

Condition	Additional Comments
Happiness	
1	Seems a bit complicated, a lot going on, a bit wordy
	Too much focus on working out the car, would've been better to focus on the trip for a positive scenario…. Makes you feel a hung up about that
	A bit tedious with all the arrangement details, pulls down from the positive emotion
	the holiday sounds great, but there isn't enough detail of that so it falls a bit flat
	The car arrangement seemed to go on a bit too much, and it wasn't exciting
2	Was feeling good at the opening, but the flatmate situation put a downer on it – focus on that killed the emotion
3	This one much better, felt like I was there or could really see it – It didn't bring in tedious stuff
	More positive emotion, more positive stuff in the details, all felt much freer, felt much happier feeling reading it
Anxiety	
1	That's so real, the details in this pulled me in
	It was easier to imagine this, like it was happening
	All the focusing on what was making me anxious made it feel real
	Easier to feel this one, not too many other things getting in the way of the focus of the anxiety
2	Can imagine this
	Feels realistic, can imagine this, horrible feelings
	Feels real, focusing on the thing that's making me feel anxious without having to deal with other stuff is making me more anxious
3	Detail is so realistic…. Can imagine it happening, the sounds and sights made it seem real, they kind of created a whole picture that made it feel real
	Felt like I was there… could almost feel the rain
	Don't like the sound of that, feels creepy, but like it was dark and rainy here
Neutral	
2	Tedious, too much milk – that's distracting, takes away from what's happening
	Too many mentions of milk, sounds odd, don't think that would happen
	Sounds like a lot of fuss over nothing, like it's pretend or just crazy
3	Tedious details, it doesn't flow like the better ones

Scenarios: *Happiness*: 1: Car Loan and Petrol Exchange; 2: Shared Flat Exchange; 3: Work Shift Exchange. Anxiety: 1: Working Hours and Module Grades; 2: Exam Results and a Holiday; 3: Walking Home with a Friend. Neutral: 2: Milk Loan and Return; 3: Shopping, Unpacking and Putting Away.

situation that you might see or hear if you were in that setting (such as darkness, rain, voices, or footsteps), or physical sensations (such as tension, or tiredness). Participants reported that these details made the scenarios seem more real, because they could more easily imagine seeing or hearing these things, and more easily imagine being in the situation in which these were described. Repetition of words such as 'you', 'they', 'so', 'and' seemed to pull participants out of the situations, or make it more difficult for them to imagine themselves within such a setting; perhaps by making the narrative more salient, and inserting a feature that reminded participants of the second-order nature of this experience (e.g., Frijda, 2000; 2005). The repetition of words seemed 'odd', and then drew participant attention away from the events that were unfolding within the scenarios.

4.6. Discussion.

Realism and Familiarity.

The realism and familiarity ratings indicated that three of these nine scenarios might be useable within the first selection tasks; one from each of the emotion-as-content conditions (work shift exchange, working hours and modules grades, turn taking with chores). However, significant difficulties were identified within these scenarios that signalled the need for further development before they would be suitable for use in the new selection tasks. Some of these difficulties were identified in participant ratings of how they felt whilst reading through the scenarios. Other difficulties were identified after the rating task, during a review of these scenarios for additional features that might cause problems if they were to be used in the new selection tasks.

Difficulties with Emotion-as-Content Conditions.

Shared Flat and Room Exchange

The *flat share-room exchange* scenario seems to contain difficulties that are embedded within the scenario and social exchange; some participants felt excited by the prospect presented in this scenario, other participants felt embarrassed and or uncomfortable when reading through the details within this account. The

embarrassed and uncomfortable responses are perhaps unsurprising, given that the content within this scenario was intended to suggest some form of sexual encounter. Participants might feel embarrassed by the subject matter in any context, or they might feel uncomfortable or embarrassed by the content *because* they are reading about it in a public setting, after being presented with it without warning whilst completing a rating task at their university. Expressed irritation with the flatmate might have been associated with this discomfort, or the descriptions of the flatmate's behaviour might have seemed irritating. A lot of content in this scenario focused on the flatmate's behaviour and their preferences; this did seem to take the focus away from content that might build to happiness and excitement. It might be possible to change the conditional in this scenario to remove the sensitive content (a party might be planned, for example), but the flatmate's behaviour would need to be altered, and this change would entail changing most of the content within this scenario.

Car Loan and Petrol Exchange

The *car loan and petrol exchange* scenario did not seem to evoke the intended emotions for the *happy emotion-as-content* condition. Again here, the content seemed to be too focused on the rationale for the agreement, and the other party (in this case, the uncle), and not sufficiently on the stimuli that was intended to provide the conditions for happiness (the holiday with friends, getting away, escaping, time off). Although this content was present at the opening, this was not built upon in the remaining content which was overshadowed by details of the car. The car loan, perhaps due to the focus upon this, also made six participants feel anxious, in case of damage to the uncle's car. This element had not been thought about; participants reported in the feedback period that the same anxiety might not exist with a car hire, as this would be insured and not include a friend's uncle. The thought of going away with friends also evoked anxiety in some participants, and this element was integral to the scenario.

Time Off – Work Shift Exchange

The *time-off work shift exchange* seemed to be the most successful scenario of those that were rated by participants in this task. The content in this scenario

focused on positive aspects of the job; the workmate was introduced as a way of creating an agreement within that setting; very little of their behaviour was presented within the scenario content, and the other content contained only brief details that were needed for the agreement to be attractive and make sense.

Working Hours and Module Grades

The *working hours and module grades* scenario seemed to be the most successful at evoking the anxiety in participants. However, participants reported feeling a little irritated by the module tutor. The inclusion of behaviour that might become a focus when feeling threatened, might be ill-advised, given that conditions in which one feels threatened can give rise to anger if another person's behaviour can seem responsible for this in some way. There were additional difficulties with this scenario, that are discussed below.

Exam Results and a Holiday

Much of the content of the of the *exam results and holiday* scenario seemed to act as a reasonably effective stimulus to anxiety, until the introduction of the conditional (promising a holiday). The conditional seemed to function as a moderately effective stimulus to happiness, which might create difficulties within this condition. In addition, n*ot-p* (i.e., not doing well in exams) provides a source of concern for participants in this scenario, which might interfere with or overshadow any concern for whether they were given a holiday for doing well in their exams, and with card selection patterns if this was presented within a selection task. *Not-p* functions atypically in this instance, in comparison with most published versions of the selection task, and in comparison with the other scenarios that were tested here.

Walking Home with a Friend

The *walking home with a friend* scenario performed poorly in this rating task. Only two out of twelve participants reported feeling moderately or very anxious when reading through this scenario. The other ten participants reported feeling happy and irritated with the friend who had arranged to walk home with them; these responses seemed to be about the removal of reasons for worry for these

participants, and so they perhaps had felt some concern up to the introduction of the friend to the scenario. The friend and conditional seemed to act as a reasonable stimulus to happiness in this condition. It may be that if the conditional offers a way to avoid the source of one's anxiety (as it does here), then the conditional might evoke happiness. If this possibility is positioned within *q*, *not-q* might then evoke anger or fear.

Again, it seems that it might not be possible to construct tasks that examine only the effects of anxiety or happiness on participant behaviour, unless perhaps all behaviours in the conditional and card array evoke the same kind of emotional response. It will be important to understand what kind of emotion might be attached to behaviours that are represented within the conditional, and within the card array options, in the future development of tasks, and when analyzing participant responses to the materials in future selection tasks.

Neutral Emotion-as-Content Conditions

Two of the scenarios that were rated here for the neutral *emotion-as-content* condition evoked similar low-intensity emotional responses in participants (milk loan, and shopping). Participants seemed to find the content contained within these scenarios a little tedious and annoying. The turn taking with house chores seemed to be the best version of a neutral condition, in that this evoked no criticisms of being tedious or annoying; it evoked mildly positive feelings in most participants, and happiness in only one. Participant verbal reports about these neutral versions, at the end of the rating task, provided a useful insight into what kind of content might be effective stimuli to emotions within this kind of scenario.

Effective Stimuli to Happiness and Anxiety

The content that evoked the most problematic responses from participants, were references to behaviours that irritated participants, and too long a focus on details of the conditions that gave rise to the agreements. Some features of the content, however, seemed to be effective stimuli to the targeted emotional responses. Content that was more effective in evoking the targeted emotional responses, focused on the source of happiness or anxiety (the events that were appealing and

exciting, or a cause for concern), and evoked sounds, sights, and feelings that might be experienced if you were in the scenarios, by describing these within the unfolding of events that were portrayed in the scenarios.

Differences in Length and Focus on Conditionals.

In the attempt to make the opening context an effective stimulus to happiness or anxiety, and simulate realistic, everyday decision contexts, the opening contexts that were developed for these two *emotion-as-content* conditions were longer than the opening contexts developed for the neutral *emotion-as-content* condition. The additional content included behaviours and events that were not related to the conditional, that had been inserted to flesh out the conditions for the targeted emotional responses, heighten the emotional nature of those conditions, and perhaps evoke happiness or anxiety before the introduction of the conditional. The difference in the length of opening contexts between happy, anxious and neutral conditions presents a difficulty, in that it represents a difference between the *emotion-as-content* conditions that could interfere with the interpretation of data obtained from these conditions. The additional content also created difficulties within some of the scenarios, by introducing details that acted as distractions from the conditional agreement, spoilt the intended emotional response, and or evoked unwanted emotional responses.

Situation of the Conditional Agreement within the Opening Context

Within these scenarios that have been presented here, the way in which the deontic conditional was situated within the opening condition differed between scenarios. In some, the deontic conditionals provided an important focus within the opening context. In others, they were presented at the end of the opening contexts and emerged out of the situation that had been depicted within them. The variation in this feature might give rise to difficulties within the selection task, and so it might be wise to control this variation in future versions of the new selection tasks.

Social Contracts.

When scenarios were reviewed after the rating task, it became clear that the conditionals used in the different scenarios contained different kinds of social

contract. The social contract in *exam grades and holiday*, and the *car loan and petrol exchange* were between parent and child, and uncle and niece or nephew. These differed from the contracts that were made in all other scenarios except the working hours and module grades, which were made between friends. The social roles of the two parties who entered the contracts thus perhaps differed, and so too might the authority that one party held over the other. This is not necessarily true, as friendships and family relationships differ. In the *working hours and module grades* scenario, the relationship between the two parties portrayed (one implicitly) within the conditional was that between tutor and student; these are different social roles again, which might signify a different level of authority between parties. The working hours and module grade scenario seems more like a promise, or perhaps advice, than a social contract, and although social contracts can be promises, this promise might not be a valid social contract (it could be if *p* was here regarded as being the satisfaction of a precondition, and *q* the benefit obtained in return). The results of working hard for a module (*p*) cannot be guaranteed, unless the student was doing so well that their performance in this module would not bring down their overall grade (*q*). These elements introduce a difference between scenarios that might be better controlled within the first new selection tasks, rather than being left to vary. It would then be possible to investigate whether these factors can influence behaviour in an empirical investigation of these questions.

Costs and Benefits.

The intended costs and benefits contained within the conditionals and opening contexts that have been considered within this chapter, differed in nature between conditions. This factor was fully realized after the rating task had been conducted, in part because of participant responses to the materials, and in part because this task prompted a re-investigation of scenarios for elements that might be differing between them (some of these thoughts have been detailed in the sketches of scenarios that are contained in Figures 3 to 11). This variation in the nature of costs and benefits is a cause for concern; it creates what might be important differences between these versions of the selection tasks, and these differences might

influence how participants respond to the agreements and subsequent behaviours within the card array.

There were no explicit benefits or costs for the tutor within the *working hard and module grades scenario*, and it would be difficult to present realistic, plausible benefits and costs for the tutor within this scenario without spoiling the intended emotional nature of that scenario. The conditional in this scenario also provided unilateral (for the student) rather than bilateral (for student and tutor) cheating options, and so it differed in this way from the other scenarios (which contained bilateral cheating options). The *exam grades and holiday* scenario contained no explicit benefits or costs for the parents, and although these might be inferred (in different ways), they had been made explicit in other scenarios.

Costs and benefits were provided within the car loan and petrol exchange scenario, and yet, there seem to be other possibly salient costs that were not intended within this condition: possible damage to the uncle's car, and being on holiday with friends were identified by participants in the rating task. These elements might spoil the cost-benefit distribution that is intended to be within the conditional and card array items, and attract participant attention within a selection task. The card array items had not been explicated within the scenarios that were rated in this chapter. However, it became very clear at this point that the costs and benefits that would be detailed within the card array items, and the emotional responses that these might evoke, needed to be very carefully controlled within and between conditions in the new selection tasks. The emotional nature of card array items, if not considered and controlled between conditions, might alter card selection patterns in the task. So too might the inclusion of different benefits and costs. The inclusion of an attractive benefit or appetitive stimulus in *not-p*, for example, could attract selection of that item more frequently than if *not-p* displayed an event that offered little interest or attraction for participants. The same would be true for all other card array items.

Twelve Participants

Twelve participants were used in this rating task to obtain a measure of how these nine scenarios might be perceived by a wider population. This is a small number of

participants, and the group might not therefore be representative of the target population. One question that arises from this is how much confidence should be placed in the responses obtained from these participants in the rating task. This rating task was conducted on a set of scenarios that were evidently flawed at the time of rating; this was known before they were rated. The rating task was used as a means of providing additional insight into what features of the scenarios might need additional development. Being engaged in the process of developing the materials to the point at which these were rated, had perhaps resulted in a particular way of viewing what was contained within these scenarios. The participant input in this rating task, helped to broaden my awareness of what factors might be operating within these materials, what might be working, what might need changing, and where I might need to pay greater attention to the design. These twelve participants provided a valuable assessment of how the content contained within the scenarios might be received within a selection task.

Pare Back Behaviours of Others, Increase Sight, Sounds, and Sensations.

Much of the content that had been inserted to heighten the conditions for the arousal of happiness or anxiety, were not needed for the agreement to be understood. Inclusion of this additional content seemed to be effective in evoking the targeted emotional responses, when it amplified a focus on sources of anxiety or appetitive stimuli. The additional content contained within the opening contexts, however, also contained elements that detracted from this focus, and gave rise to unwanted emotional responses.

To increase the probability that the targeted emotional responses would be evoked by scenarios that were developed for the new selection tasks, it seemed that the narrative should be pared back, to remove behaviours of others that might give rise to irritation, to focus on sights, sounds, and sensations that have been associated with happiness, anxiety, and neutral emotional states, and to focus the content so that it builds towards the agreement that is presented to participants in the conditional. This strategy led to significant change in the way content was written in the opening context, conditionals and card array items. This change represented as

significant achievement: the development of more dynamic materials for the new selection tasks. This development is presented in the following chapter.

4.7. Summary

Nine scenarios that were constructed during the process of constructing the new selection task, have been presented and evaluated within this chapter. Their presentation allows a demonstration of some of the practical and theoretical work that was involved, on the way to constructing a reliable and effective vehicle that would allow the investigation of the influences of happiness, anxiety and neutral *emotion-as-content* on task selection within the new selection tasks. A more specific focus on the concrete attempt to construct task content that would act as effective stimuli to the intended *emotion-as-content* conditions (happiness, anxiety and neutral) has been provided here than has been presented in previous chapters. The rating task presented towards the end of this chapter, describes the first substantial effort to determine whether the task content presented here, was sufficiently developed to act as a reliable stimulus to either happiness, anxiety or no emotional response (the results of this assessment indicated that they were not).

Chapter Five. Development of Materials for The New Selection Task

5.1. Introduction: The Creation of New Emotion-as-Content Tasks

After the rating task that was reported in the last chapter, a significant change in the development of materials for the selection task was realized; nine different scenarios were developed that contained the *same* conditional agreement and card array behaviours in each of their *emotion-as-content* conditions. Much of the opening context within each of the nine scenarios was also shared between the *happy*, *anxious* and *neutral* conditions. An outline of the construction of these nine versions is presented within this chapter. Several additional variables that might be expected to influence participant behaviour in the selection task, were identified during this stage of task development; these were included within the design of the new task materials, and they too are considered briefly here. From these nine scenarios, six scenarios were selected for use within the first selection task, following an assessment of their emotional nature in a participant rating study; this study is presented towards the end of this chapter.

5.1.1. One Scenario: Three Emotion-as-Content Conditions

The nine scenarios that were assessed in the rating task described towards the end of chapter four, were not developed further for use in the new selection tasks. All nine scenarios were flawed in important ways, but they might be developed at a later date. Aside from the flaws identified within each of the scenarios that had been developed at this point, one large problem remained that would not be removed *even if* the scenarios could be developed so that they evoked the targeted emotions, and no others. The situations depicted *within* the *emotion-as-content* conditions differed *between* these conditions; they contained different opening contexts, different conditional agreements, and different card array behaviours. Any differences or lack of differences in card selection patterns between the *emotion-as-content* conditions, might be caused by differences within their content

rather than by the difference in emotion evoked by those conditions. Unless a way was found to remove this difficulty, it would be difficult to argue convincingly that any differences or lack of differences in selection patterns between tasks were the result of the targeted different emotional responses within those conditions. Too many potential confounds would be at play – any of which might be driving participant behaviour in the new selection tasks, much as they might have been in the old versions of this task.

Scenarios that had been developed up to this point were put aside, because a way of creating what might be regarded as being the 'same' scenario within each of the *emotion-as-content* conditions was realized after the rating task. Focusing on the importance of context for understanding and appraising the meaning of behaviours and events, and the changing nature of an emotional response to any one object, action or event across time[25], it became clear that the 'same' conditional agreement and card array items could be placed within the happy, anxious, and neutral *emotion-as-content* conditions, and that they could take on the different emotional nature of each of those *emotion-as-content* conditions. That is, the same conditional and card array items (same in surface form, and logical structure) could be used to evoke either anxiety, happiness or no emotional response.

This development was also prompted by a reconsideration of how meaning is contained within or conveyed by words. Words might be thought of as having fixed meanings: if you ask someone whether the train will arrive on time and they answer 'no', you understand what they mean. However, in practice, what might be regarded as being the same individual words and or phrases can mean very different things: meaning is not static, or fixed. The word 'no', for example, can mean 'not any', it can signify opposition, or negation, it can be used to modify, it can be used as a directive, or as a word of advice, as a threat, as a tease, or as an exclamation of sarcastic or genuine disbelief. This element of language use has

[25] These issues were discussed in chapters two and three: for example, we can have more than one emotion to what might be regarded as being the 'same' object, and we can react with different emotions to the 'same' object at different times, depending upon other factors such as what other concerns are present, tiredness, background mood state, goals, other people, and what social role we are occupying.

been recognized for many years (e.g., Austin, 1962; Edwards, Ashmore & Potter, 1995; Searle, 1969; Shotter, 1993; Stalnaker, 1970; 1999). Semantics have been shown to influence reasoning (e.g., Bonnefon & Villejoubert, 2007; Hilton, 1995) Nickerson, 2015; Oaksford & Chater, 2007). Indeed, an understanding of the important influence that pragmatic factors have on reasoning and decision making, was part of what propelled the turn away from the old normative models of logic in which reasoning that was unimpaired by context was positioned as being the standard against which intelligence and rationality should be measured (e.g., Rips, 1990; 1994; Oaksford & Chater, 1998; Wason, 1968). The same pragmatic turn is evident in theoretical accounts of cognition (e.g., Dascal, & Françozo, 1988; Engel, Maye, Kurthen, & König, 2013; Menary, 2016). Our understanding of what language means is informed by the immediate and broader context in which it is being used, our understanding of language use, and our learning histories (e.g., what associations we have with the context, words, and relevant relationships). For example, if the train arriving or not arriving on time has important consequences for you, the emotional significance and utility of that answer will be very different than if the train's arrival time had no significance for you. This emotional significance, importance and value of language use, has not received the same research attention that has been given to other pragmatic features of language use, and yet this is an important pragmatic component of everyday language use, thinking, decision making and behaviour (e.g., Blackburn, 1998; De Sousa, 1990).

An important sense of *what* is conveyed in language use, is not contained within the bare stimulus; it is inferred. If you are stood in a kitchen with someone, for example, and they ask '*what did you do with the milk*', you might understand that they want to use the milk or take it or put it somewhere, and that they cannot find it: perhaps it is not where it usually is, and as you are also present they think that you might have moved it, and so they are asking you this question. You might also think they were offering to make you a drink, or that they were being critical of you, depending upon your relationship and recent events. If you were a participant who had just completed the last rating task, you might be thinking '*not milk, again*!'.

When a deeper appreciation of this feature of language was combined with an understanding that our emotional responses to objects or events or behaviours are not fixed, static entities, but also depend upon context, in which meaning, preferences, significance, and importance are inferred, a way of using the 'same' situations, conditionals and card arrays across *emotion-as-content* conditions was realized. It might not be possible to change the emotional nature of all objects, events or behaviours, but it was possible to create scenarios that would allow this achievement within the design constraints that had been set out for the new selection tasks. Within the new scenarios that were developed from this point, the conditional and card array items would take their emotional nature from the opening context, which would create the emotional significance and value of the behaviours that were represented within the agreements and outcome behaviours. This marked a significant achievement within the process of developing materials for the new selection tasks. The creation of these scenarios would allow much greater confidence in determining what factors might be driving selection patterns in the new tasks.

5.1.2. Controlling Additional Key Variables

Several additional factors were identified whilst constructing the new tasks (earlier discarded versions and the versions presented here), which might influence participant behaviour in the selection tasks. Some of these were presented in the previous chapter, some will be outlined here. A summary of these is provided in Table eight, to provide an overview of the key features that were controlled within the new selection tasks. These variables summarised in Table eight, as before, are not independent, and they have not been completely separated in the discussions that follow, below. Listing them separately in Table eight, allows the identification of different elements that might be influencing information processing and behaviour within the decision contexts that were included within the new selection tasks. The new variables were controlled within all subsequent materials that were developed for the new selection tasks. Some of the factors had been identified as having influenced participant behaviour in previous published studies with the selection task, some were realized whilst developing content that would work

within the new tasks: either as a result of testing the kinds of emotional responses they might evoke on participants in two additional rating tasks, or whilst considering different kinds of content that might work as desired in the new tasks. Variables that were identified as having an important influence on participant behaviour in chapter two, are outlined briefly in Table nine, to provide an updated overview of key variables that were controlled within the new tasks.

Table 8. Additional variables that influence selection task behaviour: Identified during the development phase of the new selection task.

Variables.	Summary Description/ Relevance….
Commitment to Conditional	Social contracts must be regarded as being binding, and signify obligation to do as agreed
Must (modal)	Use within conditional agreements, signify necessity of behaviour, and obligation, Use across conditions.
Agreement and Outcome Importance: The Importance of Rule Adherence and Violation	The importance of agreements and their outcomes to those who make them (whether adhered to or breached) can vary enormously. Responses to the behaviours that signify violation might be expected to vary with perceived importance, or utility
Enabling and Disabling Conditions, Mitigating and Aggravating Circumstances	Meaning of Behaviour (excused *vs*. blameworthiness), rule violations might not be viewed as being a rule violations. Need to ensure that *not-p* and *not-q* do not contain content that might be perceived to nullify or not breach the social contracts.
Alternative Causes	Ensure that *not-p* and *not-q* are perceived as being *not-p* and *not-q*, rather than *alt-ps* and *alt-qs*.
Card Array: Clear Exemplars	Avoid negation. Balance Cost-Benefits between emotion-as-content conditions
Social Roles	Carry expectations, and constraints on behaviour
Relationships	Friendship, competitors, dislike, distrust
Expectations of Other	Trust, Distrust, within roles and relationships

Table 9. First variables identified as influences on selection task behaviour:

Identified during the initial development phase of the new selection task.

Variables	Summary
Realism, Plausibility Familiarity, Mundanity Ecological Validity	Of the conditional, context and card array options; of situations in which checking for rule violation might occur, of social contracts, provides meaning, coherence
Meaningfulness Congruence	Of connection Between *p, q*, between opening context and conditional agreement, of all card array items, and the task. Between rule context, content and components (and card array items).
Emotion-as-Content	Content must be effective stimulus to emotion-as-content conditions
Goals	Central role in many emotions, motivation for behaviour, avoid conflicts, important for rationality$_1$ (Evans & Over, 1996)
Relevance to Self	Realization of benefits and costs, important for stimuli to activate targeted emotional response
Natural Spoken Language	Style of content: simulate realism, familiarity, everyday written or spoken communication, or thought
Narrative	Style, use to present other factors (not necessary, used here)
Breach of norms	Avoid content that likely to breach these within materials (social, moral, religious, legal, cultural, avoid emotional responses, belief bias)
Heavy Cuing	Expectations of rule violation or cheating, cued within instructions or context
Self and Other	Within opening context, contract and card array items, allow testing of perspective effects, shifting of where costs and benefits situated, investigation of emotion
Deontic Task and Conditional	About behaviour, actions, allow perspective investigation, pragmatic, prudential agreements
Social Contracts	Access to benefits, within society, and personal relationships, obtained by meeting a precondition or paying a cost
Cheater Detection Paradigm	Look for cheater, or rule breaker or rule violation instructions, and content that cues expectation of rule violation or cheating
Negations	Omit to avoid variation between *emotion-as-content* conditions
Generalise across Participants	Relevance of factors for participants who complete the selection tasks

Commitment to the Social Contract

Social contracts have been used to manage different kinds of relationships (e.g., between different countries, companies, governments and citizens, parents and children, employers and employees, friends, co-workers). Some contracts are established as rules or regulations, or codes of conduct, others might be pragmatic ground rules that are proposed to guide behaviour, or promises, or agreements. Social contracts that are established as rules, laws or regulations are not necessarily viewed as being binding by those to whom they apply. Driving above the speed limit in the United Kingdom, for example, represents a breach of Road Safety regulations, and yet speeding offences are common in this country. However, the conditional agreements that are developed for the new selection tasks need to be seen as being binding agreements by the participants in those tasks, for them to function as social contracts. If the social agreements are not understood to be firm or binding commitments, the behaviours that are represented within the card arrays might not be viewed as being evidence of violation of or adherence to that agreement. The word '*must*' can be used to express a command, obligation or necessity, and so use of this word within the conditional agreement might help to position the social exchange as being binding. This term was used in some of the early deontic versions of the selection task, which took the form '*if p, then must q*', for example, '*if you are drinking beer, then you must be over 18 years of age*' (e.g., Cheng & Holyoak, 1985). However, as the discussion of language use above highlights, *must* need not be interpreted in this way; *must* might be used in an insincere offer to meet at an unspecified later date, as in '*we really must catch up*'. Nevertheless, the prudential agreements that are developed for the new selection tasks must be positioned within the scenarios so that it is clear they are to be regarded as being binding social contracts to which each party is firmly committed. *Must* was used within the conditional agreements that were developed for the first selection tasks, therefore, in a manner that was intended to signify that each party had made a firm commitment to do what they had agreed in the social contracts.

Alternative Causes, Disabling Conditions, Mitigating and Aggravating Circumstances, Importance of Rules, Outcomes, Rule-Violation and Rule-Adherence.

The factors that are considered in this section have not been applied to previous selection task investigations (they have been discussed in relation to causal deontic conditionals). However, they are relevant to the new selection tasks, and can be adapted to provide a way of thinking about important possible influences on selection task behaviour. Modus Ponens (in an epistemic conditional, *if p then q*, *p*, therefore *q*) and Modus Tollens (again, in an epistemic conditional, *if p, then q*, *not-q*, therefore *not-p*) inferences have been shown to be suppressed by the introduction of additional premises (alternative and disabling *p*s and *q*s), which are thought to decrease certainty in the major premises (*p* and *q*) (e.g., Stevenson & Over, 1995). Causal conditional inferences that might otherwise be made without hesitation, have been shown to be undermined by information that presents alternatives causes for *q*, or disabling conditions that raise doubt about the certainty of the causal connection between *p* and *q* (e.g., Cummins, Lubart, Alksnis, & Rist, 1991). In deontics, behaviour that represents a violation of an agreement or rule is not necessarily regarded as being a violation of that agreement or rule (e.g., Manktelow, Fairley, Kilpatrick & Over, 2000). The presence of mitigating circumstances can lead to a downplaying of or exemption from or cancellation of contracts in consideration of a more important factor. An example of this is provided by a man breaking speed limits to get his partner, who is in labour or in need of urgent medical assistance, to hospital. If a hospital admission or illness prevented you from doing something that you had agreed in a private social contract (or any social contract, or promise, for example), that failure might not be regarded as being a breach of promise or contract.

Manktelow et al. (e.g., Manktelow & Fairley, 2000, Manktelow et al., 2000) have argued that perspective effects (which were discussed in chapter two), depend upon the question of what counts as rule violation or falsification. Human reasoning has been shown to be heavily influenced by pragmatic factors. In a deontic conditional, *if p then q*, *q* might be regarded as being satisfied by an alternative

cause (*alt-p*)[26] that provides an accepted substitute for *p*. Although this alternative *p* might be regarded as being *not-p*, if it seems to satisfy the role held by *p*, then it might instead be accepted as being a good substitute in for *p* rather than being *not-p*. Disabling conditions have been identified as being factors that cast doubt on *p* as the cause for *q*, or prevent *p* from being satisfied (Manktelow et al., 2000).

In a deontic pragmatic agreement, in this case that includes two parties in an exchange of costs and benefits, alternative causes and disabling conditions provide a useful way of thinking about rule violation, substitutions and mitigating circumstances, participant behaviour in the selection task, and of understanding human behaviour. This can be demonstrated by examples. Two friends enter a private social contract and agree to an exchange of benefits and costs between them for their mutual benefit, with one party in the antecedent, and the other in the consequent. Their exchange might be represented as follows:

If I do p, then you must do q

If I wait for you at our usual bus stop, you must ring me if you're running late

In this example, one person has agreed to wait for their partner at the bus stop they use to travel home from work, so that they can travel home together after work, it is late, and raining, they have a lot of luggage to carry home, and their partner has offered to help carry that. The partner will be in a very important meeting all afternoon, but they think it will finish on time to help carry the luggage. Let us imagine that there are roadworks surrounding the bus stop that was planned for the meeting, and so it is not possible to wait there. You might stand a little further down the road, as close to the usual bus stop as possible. Perhaps a temporary bus stop has been erected as a substitute for that one, and you wait there. You are not therefore at the promised bus stop, but we might accept this as being *alt-p*, a good substitute for *p* in the circumstances rather than *not-p* or a violation of the agreement. There are good reasons (e.g., Stein, 1996)[27] for not

[26] The abbreviations *alt-p* and *dis-q* have been created to discuss the new selection task material. They have been derived from the terms that have been used to discuss the comprehension of causal deontic conditionals in the studies referenced here.

[27] This account is, therefore, relevant to discussions of rationality, and emotion.

being in the agreed location. Imagine that the partner will be late, and they cannot use their phone, perhaps the battery is flat, or they cannot get away from the meeting and they cannot use their phone in that building. So, the partner asks a colleague to ring you to let you know that they cannot meet as planned. Or, they might ask a colleague to meet you at the bus stop (it is nearby), to let you know that they will be late and cannot ring you as agreed. These behaviours might be regarded as being acceptable *alt-q*s, rather than *not-q* or violations of the agreement. There are good reasons for the discrepancy between what you do and what was agreed. If, however, the partner changed their mind about helping with the luggage and asked a colleague to call their partner, or meet them at the bus stop, to let them know that they had decided to stay late at work to catch up with some paperwork, those same behaviours might be regarded as being *not-q*, and violations of the agreement. If the partner who was supposed to be waiting at the bus stop decided to wait in the pub to keep out of the rain, and then got caught up talking to a colleague and forgot the time, that behaviour might be regarded as being *not-p* if they were not as the bus stop as agreed when their partner arrived to help with the luggage. These elements interact with emotion; the behaviours might have different meanings within that relationship, and they might evoke different emotional responses. There might be more at stake here than just meeting as agreed and carrying or not carrying the luggage; a valued relationship might also be threatened. The perceived importance or significance of an agreement might affect the perceived importance of adherence to or violation of that agreement. These factors will influence our emotional responses to behaviour. Behaviour can be interpreted as having a greater or lesser importance, depending other factors such as goals (single or multiple, congruent and or conflicting), current emotional state, tiredness, recent and near future expected events.

These latter examples, that might be interpreted more easily as being instances of breach of promise, might be understood as being aggravating circumstances; where it seems that you might easily have done as agreed, or promised, but chose to do something else instead for *no good reason*. These behaviours might be seen as being unreasonable, impolite, uncaring, or blameworthy. Ortony et al. (1988)

positioned the appraisal of blameworthiness as an important condition for anger (or guilt, or shame), in addition to something that displeased you, or threatened an important goal. Behaviours that are perceived to be less blameworthy, might evoke other emotions, such as regret, sadness, anxiety or relief. Other behaviours might be regarded as being good-enough substitutes for *p* and *q* (i.e., *alt-p* or *alt-q*) in another social contract, such as bringing white wine instead of the red wine that had been promised in a private social contract between friends.

These examples demonstrate the care that should be taken when determining what behaviours might be presented within the card array within the new selection tasks. Some behaviours that are positioned as *not-p* or *not-q* might not be regarded as being *not-p* or *not-q* if they seem to be reasonable substitutes for *p* or *q*. Other behaviours that are positioned as *not-p* or *not-q* might act as a stimulus to anger or other emotions (such as *hope*, or *guilt*, or *grief*), that have not been targeted for investigation within this research programme. Their arousal might influence card selection behaviour. The appraisal of rule violation in deontic contexts can be affected by utility, by perspective, meaning and importance. This discussion is relevant also to an insight that was obtained from the rating task; events or behaviours depicted within the card array that repulse or seem appetitive, within any of the card array positions, might also influence card selection behaviour. The emotional responses that might be evoked by behaviours within the card array, need to be understood and controlled within and between *emotion-as-content* conditions, and considered when analysing selection task data.

Social Roles and Relationships, Expectations of Behaviour

The importance of social roles for understanding perspective effects in the deontic versions of the selection task was discussed in chapters two and three in terms of the perspective that they provided in the assessment of costs and benefits (Gigerenzer & Hug, 1992; Manktelow & Over, 1991). Social roles can be accompanied by expectations and restrictions on behaviour, and priming participants to expect rule breaking or violation within the selection task has been thought to influence card selection. Social relationships also carry expectations of

how another person will behave. De Sousa (e.g., 1990) has argued that a friend, by definition, is expected to behave fairly in their dealings with you – you trust a friend. An enemy, or someone who is generally not trustworthy, in contrast, might be expected to not treat you with the same consideration that a friend might, or to behave dishonourably. Lorenz (e.g., 1999) has argued that boundedly rational agents use trust as a guide within their navigation of successful social contracts, in which they might set up more or fewer procedures and rules for guiding behaviour within them. Different relationships within the selection task might contain these different expectations of behaviour in relation to rule violation or adherence. The nature of the relationships that are contained within the selection tasks, and the behavioural expectations that are attached to them, should therefore be considered and controlled within and between *emotion-as-content* conditions, to avoid their possible unsystematic influence on card selection.

5.1.3. Phenomenology and Emotion.

The development of new selection tasks versions, which is presented in this chapter, drew upon the factors that have been identified thus far as being important considerations in task development. Their development was also guided by thinking about emotion experience in terms of first and second order phenomenology (e.g., Frijda, 2005; 2009; Lambie & Marcel, 2002). The draft selection task versions that were considered in chapter four, contained some features that seemed to be particularly effective at evoking happiness or anxiety (e.g., a focus on the cause of happiness or anxiety, sights, sounds and feelings that might be experienced in the situations described); these seemed to encourage immersion in the unfolding events that were depicted within scenarios, from the perspective that had been positioned within them to evoke either happiness or anxiety. Other features within these scenarios seemed to annoy or spoil the intended emotion-as-as-content conditions (e.g., repetition of words, behaviour of others that was overly detailed or fussy, or might be blamed for situations in which one might feel threatened). The repetition of words seemed to interrupt or present an obstacle to immersion within the online unfolding of events within those

scenarios, or to reduce the plausibility or realism of objects, behaviours or events depicted within the situations described.

Frijda (2005, 2009) has argued that emotion experience differs from non-emotional experiences in three important ways: wholeness, control precedence and valuation. Wholeness describes the way in which some emotion experiences can seem to engage the person 'as a whole', so that perception, thought, feelings, behaviour and physical responses can seem to be more completely interconnected; they appear to be focused on the object of one's concern (i.e., the objects, events or behaviours that elicit and give them meaning). Control precedence refers to the feelings, urges, desires, impulses, or thoughts that seem to be prioritized in attention, thought and action tendencies in emotional states, and the persistence of these urges even if they seem to be inappropriate for the context in which they arise. Valuation refers to the experience of value that is associated with emotion experience, which we might understand as utility. Objects, events, activities, people, ideas that were care about are valued, and this value might be felt within the experience as, for example, something pleasurable, or enticing, or repulsive or disquieting or unpleasant. Valuation is also about engagement; focusing attention on, spending time thinking about or engaged with your feelings or the thing you feel emotional about. These three features are not meant to provide a comprehensive account of what differentiates emotion and non-emotion experience, and they need not occur together. Simulation of emotional experience, of any experience, requires going beyond words, but it is words that are being used to evoke happiness and anxiety within the new selection tasks. Thinking about the phenomenology of emotion provided a useful way of thinking about what kind of words might be effective stimuli to emotion within the new selection tasks.

Emotion experience can be *reflective* and *non-reflective* (e.g., Frijda, 1986; 2009; Sartre, 1939), or consist of *first* and *second order* kinds of consciousness (e.g. Lambie & Marcel, 2002). First order phenomenology involves immersion within an experience, in which attention is focused upon what you are experiencing: on sights, sounds, feeling attracted, or repulsed, on an awareness of features around you. The kind of emotion experience can include urges, and impulses. Second order

phenomenology, which is involved in the recall of emotion experience, involves an awareness that one is having specific kind of experience and the ability to report upon it (e.g., to be aware that one is irritated by details, or by behaviours, or attracted to something or someone, or repulsed). This kind of awareness allows for a shift of attention, and for emotions or experiences to be altered by thought, and reflection. Both kinds of experience can be part of emotion., and attention can switch between these two modes. In emotion attention can also switch between world and self.

Behavioural impulses that have been associated with happiness are a readiness to engage with ideas, or activities that we believe we might enjoy, or other people that we have positive feelings for, or our surroundings. Happiness can be associated with exuberance, laughter, amusement, and wanting to savour what is being enjoyed. In happiness, we might feel aware of a something enticing or attractive, a readiness to have more of what is pleasing, the desire to play, the desire to approach, to make or prolong contact with the stimuli that we regard as being rewarding or of benefit, and with the current emotional state, wanting nothing to change (Arnold, 1960; Frijda, 2009). We might feel an urge to hug someone, to touch, or kiss, or run, or jump, or the urge to remain where we are, feeling at peace and content (Frijda, Kuipers, ter Schure, 1989; Lazarus, 1991). Some states of happiness are thus accompanied by a high level of physiological arousal, which prepares us for energetic behaviours. The sates of happiness in which we feel content to stay where we are, are associated with low states of physiological arousal. As with all emotions, what we do when feeling happiness, depends upon factors such as what we feel happy about, the utility of the effect this might have upon our circumstances, the intensity of our happiness, where we are at the time of feeling happy and what affordances are available within this setting, the expected consequences of different behavioural response (benefits, and costs), our state of health, our behavioural habits, and preferences (towards being reserved or more ebullient, for example).

Anxiety is associated with elevated levels of physiological arousal (e.g., a fast heartbeat, increased physical tension), which mobilises the resources that might be

needed to respond to possible threats (Frijda, 1986; Öhman, 2000). The physical discomfort that is felt in anxiety might provide reasons for acting, to diminish that discomfort (e.g., Greenspan, 2004). The behavioural impulses that are associated with anxiety are thought to be focused on coping with the perceived threats. One response that seems to be an automatic component of anxiety, is an elevated state of alertness for and a focus on perceived threats. We are prone to negative expectation and interpretative biases. The former perhaps allows us to detect the presence of threat more rapidly and efficiently than me might if we were not prepared for an imminent threat. In an anxious state we are primed to expect the presence of threatening objects or events, and their occurrence seems more probable than when we are in positive or neutral states (e.g., Öhman, 2000). A focus on possible threats allows us to process them more thoroughly, to determine whether we need to act, and what we might then do to cope with perceived threats. An anxious person might feel small, or vulnerable, or a dreadful sense of foreboding, they might be aware of a dry throat, and a thumping heartbeat within their chest.

These features of emotion can be enduring in more intense emotional states, or fleeting in what Frijda (2005) calls small emotions, which are less intense, brief emotional responses to objects and events that we encounter throughout the day. These ideas about the experience of emotion, in addition to all of the factors that have been considered during task construction thus far within the thesis, were used to shape the content created in the selection tasks presented below; these versions would be used in the first major selection task study.

5.1.4. New Selection Task Scenarios: Examples of the Development Process.

Following the rating task and subsequent review of materials, that was outlined in the last chapter, a new set of nine scenarios were developed for the new selection task. Each of these nine scenarios were constructed in each of the three emotion-as-content conditions. The three *emotion-as-content* conditions *within* each of the nine different scenarios contained the same conditional agreement and card array items; the opening contexts differed slightly *within* each scenario *between* the

emotion-as-content conditions, to create the different emotional natures required within these conditions. Nine scenarios were constructed at this stage to allow the 'best' of them to be selected for use in the first selection task. Which scenarios might be the best stimuli to the targeted emotion as-content conditions, would be determined via a rating task that would provide a proxy for the emotional nature of these new materials.

The development of these nine new scenarios is outlined briefly below (see Figures 20-26), using *one* of the scenarios in each of the three *emotion-as-content* conditions to provide an example of the process that was followed. The notes provided in these Figures show part of the process that was involved in developing the Driving scenario, beginning with the first sketch that was developed for this scenario, a few of the notes that were made at the time to guide the development process, and some of the changes that were made to the materials during this process. The other eight scenarios that were developed at this stage, include having dinner in a restaurant, meeting someone at the train station on the platform where your train pulls in after a train journey, leaving a friend's house to collect a parcel, travelling to catch a plane, working with a friend or colleague to complete coursework, travelling on a boat, sledging, and a week away with friends or for work within this country. Two rating tasks that have not been reported here were conducted during the process of constructing these nine scenarios, to assist with the development content that seemed likely to evoke either happiness, anxiety or no real emotion. The method and instructions used for these tasks was identical to those used for the rating task that has been reported at the close of chapter four. A larger rating task was conducted when it seemed possible that the materials might be ready to use in an investigation of how emotions influence card selection (i.e., when they seemed likely to evoke to targeted emotional response: happy, anxious, or no emotional response). This larger rating task is presented below, after the Figures that describe the development of the driving scenarios.

Notes from the initial Driving sketch.

Senses that want to evoke: Happiness: approach, excitement, laughter wanting to touch, perhaps kiss, a release of tension or a build-up of exciting energy
Anxiety: avoid, retreat, disengage, desire to get away
Uncertainty about what happening might work in *happy* and *anxious* conditions

Select adjectives that create a feeling of speed in *happy* and *anxious* conditions, to help to create a sense of high arousal in these conditions, slow this down in the neutral condition, minimize or avoid cues to arousal, use adjectives that indicate flatness, or mundanity there

Include sights, sounds, and sensations that might be felt, try to create conditions for happiness or anxiety within this focus, what might be salient in the unfolding events. If details and focus differ between *anxious* and *happy*, these will again represent differences that could interfere with card selection, and thus spoil any argument that differences are caused by emotion. Is there a way to make the content almost the 'same' in the different emotion-as-content conditions? Perhaps change adjectives, and make minor changes in focus within the scene to create the different *emotion-as-content* conditions?

Use of '*I*' and '*me*' or '*you*' for the participant's perspective, is one more immediate? Does use of first-person perspective feel more personal, relevant, when reading scenario, and imaging oneself within it? Might help to draw a reader in.

¬*p*: you go home alone, you go home with someone else, you go to a party (avoid negation, but use clear exemplars, must be seen as being ¬*p*)
¬*q*: You get a taxi back to their house (is this *not-q*? seems unclear, need clear exemplars)

Driving, an initial sketch

You've spent the day doing *happy*, *anxious*, *neutral* things, you've met with friends this evening, in a pub, leaving the pub, you're offered a lift …. Episode moves into car … being driven home

You want to go home, they want to come home with you, or perhaps want you to go back to their place.

Possible conditional and card array

If you go home with them, then they must let you drive

p	you (I) go home with them
¬*p*	You (I) go home alone
q	They let you (me) drive
¬*q*	They drive you (me) to their house

Figure 20. Notes from construction of the driving scenarios: Initial sketch and notes.

Possible opening contexts, to precede the drive home and agreement. Use this section to set emotional tone. Limit differences between *emotion-as-content* conditions, share content across conditions, and change adjectives or focus to create conditions for the different emotions.

Anxiety: Opening fleshed out to build conditions for anxiety	You've spent a full day in the library revising for your exams (*open with anxiety stimulus*). You feel as though you've left your revision a bit too late; you've got loads of stuff to learn and are worried whether you're going to scrape through this term (*build source of worry*). You go out to the pub with your friends, to have a drink and try to forget about exams (*slight respite, links to event that could be happy, anxious or neutral*), and you get into an argument with one of your best friends. He's been bitching about you all week and is in a foul mood this evening. You feel as though you don't really know him anymore and can't work out what you've done to upset him or what the disagreement is really about (*focus back to stressful events*). You leave the pub feeling tired and upset and decide to go home to try and get some sleep (*wanting to get away, offers relief from anxiety?*). One of your housemates (*change this to partner, girlfriend, boyfriend… allows for different behaviours within the car*) comes after you and offers to drive you home because you've been drinking (*change this to back to their place, remove suggestion of drinking, re driving – card array items? Disapproval?*).
Positive: Opening fleshed out, keep similar but build conditions for happiness	You've spent the day out with friends. You feel relaxed, you've got the next two weeks off, and you've got exciting plans. The sun is still shining, it's a beautiful evening, and you're looking forward to a night out in the pub with your friends, having a drink and chatting about the day's events (*creating conditions for happiness, a little too relaxed? Anxiety may be more intense*). One of your best friends is telling a funny story about what they got up to last week. He's been away and is good form this evening. You feel as though you've been friends for years; you get on so easily and share a similar sense of humour (*retaining similar content, framed for happiness*). You leave the pub feeling a little sleepy and relaxed and decide to go home to get some sleep. One of your housemates comes after you and offers to drive you home because you've been drinking (*change this in line with above*)
Neutral: Opening, try to 'flatten' but retain similarity in content	You've spent the day at home. You feel a bit tired, you've been doing odd jobs and getting a bit of a rest. It's still light this evening as you go out to meet some friends in the pub. You're having a drink and chatting about the day's events; one of your best friends is telling you what he's been doing today. He's been at work and his day sounds like most of his other days at work – quite easy going, and nothing out of the ordinary happening. You've been friends for years; you get on well and like his company. You leave the pub feeling a little sleepy and decide to go home to get some sleep. One of your housemates comes after you and offers to drive you home because you've been drinking. (*change this, in line with above, content might need flattening further to flatten mood to neutral?*)

Key: opening context for the selection task is presented in ordinary test within the main box; notes are written in italic font

Figure 21. Notes from construction of the driving scenarios: Draft opening contexts in *emotion-as-content* conditions.

Focus on building emotions here, the last sections were a little flat, distant, or remote, not quite engaging or real, need to improve feeling of immediacy, as though the situation might be happening now. Create more dynamic conditions for happiness and anxiety. Focus on driving, more immersion in sights, sounds, unfolding events, evoke more of a sense of immediacy, and of events unfolding online, moment to moment, cut down differences between conditions, retain as many features as possible that do not differ between emotion as content condition. There are possibly too many differences in the preceding opening contexts.	
Develop this episode so that it now moves to unfolding within a moving car, in which you are being driven by another, focus on the experience of this drive	
Anxious	You get into the car with your girlfriend (*boyfriend, can I ask participants about sexual preferences to ensure match with preferences?*), it's cold, windy, dark, thrashing rain – it's bouncing off the pavement (*unpleasant, unsettled, not enticing*), difficult to see through the rain and the headlights from oncoming cars, she's driving too fast (*build tension, lack of control over events*), coming towards a heavy bend, skid into the oncoming lane, heavy goods lorry coming towards you, you're not driving and so you have no control over the car (*threat of injury, car crash, no control over car*). She pulls over at a café or lay by after that horrendous drive.
Happy	You get into the car with your girlfriend (*boyfriend*), it's a warm night, still, quiet, clear skies, you're listening to some of your favourite music, you can see trees and night sky through the windscreen (*pleasant, settled, safe, comfortable*), and the lights of oncoming cars, she's driving well, coming towards a heavy bend, and she slows down as she drives into it, after rounding the bend she pulls the car over at a café or lay by after a pleasant drive. (*copy the events in the anxiogenic condition, but shift of focus and details, change of speed and tension too, try to match these aspects to the anxious condition, to equal physiological arousal, or it might be the difference in arousal rather than emotion that driving any differences between these conditions*)
Neutral	You get into the car with your friend (*replace partner with friend to lessen intimacy? will this change the nature of the agreement/ contract*?). it's a dry night, quiet, cloudy sky, you're talking a bit as she drives, you can see cars, people, houses on the roadside as you pass by, and the lights of oncoming cars and streetlights, she's driving steadily, you're coming towards a bend in the road, and she slows down as she drives into it, after rounding the bend she pulls the car over at a café or lay by after the short drive.
Social contract	You want to go home, she wants to go back to her place, you don't want the night to end here: *If you come home with her, then she must let you drive* *Need to create rationales for the happy and neutral conditions for this agreement, it's almost there for the anxiogenic content, but needs a little more there to make it clear. Try to split cost and benefit, to either side of conditional (p, q) for each party if possible: if you do p (cost you, benefit them), they must do q (cost them, benefit you).*

Key: opening context for the selection task is presented in ordinary test within the main box; notes are written in italic font.

Figure 22. Notes from construction of the driving scenarios: Draft opening contexts to conditional agreements.

Initial opening contexts (Figure 21) seem too distant, they contain too many details that can seem tedious, the emotional excitement if there is too easily lost (tested on participants, *N* = 15): sections that contain the driving episodes are much more effective at evoking the intended emotions. Cut out the opening contexts, to remove unnecessary details, and remove differences that were a concern between content conditions. Focus on building the emotional content within the driving episodes. Focus on sights, sounds, thoughts that experienced during this drive, creating an episode that feels more like it's unfolding, moment to moment, increase immediacy.

Adjust the Driving scenarios here so that they take place within a moving car, in which you are being driven by another, focus content on the experience of this drive.

Notes: *The episodes opens and unfolds in a moving car – speed is used to try to heighten physiological arousal. Feelings, sights and sounds are inserted that might evoke a sense of feeling uncomfortable, and ill at ease. Need to take care not to 'overdo' the drama (with thunder, lightening perhaps); this needs to feel real, and not like a spoof horror film. Consider use of gender within partner, perhaps use 'they' instead of he/she/him/her – gender terms might cause problems (i.e., evoke the wrong response, such as feeling unreal, repulsive, weird) if the gender doesn't match the preference of participants. 'You' has been replaced with 'I' to increase immediacy in these versions; it feels more intimate, and immediate? To many instances of 'I' have been removed from this version: they were intruding, evoking irritation and making it more apparent that you are reading a story (a badly written one): feedback obtained from participant ratings of these mid-way through construction of these more focused versions (N = 20). Use of the birthday here, allows this to be adjusted for the happy condition, as a stimulus that might be associated with happiness. Focus on aspects of this element that might evoke anxiety – the event being forgotten by you, which directs thoughts towards discomfort and potential fallout that might follow from that. Offer a way out (q) that does not remove the anxiety*

Driving: Opening Context. I'm being driven along a dual carriageway by my girl(boy)friend and I'm feeling incredibly tense. Heavy rain is bouncing off the windscreen; (s)he's got the window open to get some fresh air, it's freezing cold and it's dark. We're being dazzled by the lights of oncoming traffic which is travelling way too fast. Water is pouring down the roadside and there are patches of black ice on the ground. We've been in the pub this evening celebrating her(his) birthday, which I'd forgotten about until (s)he reminded me, and (s)he's gone silent. I think (s)he's almost crying as we're driving along and I wish this evening would come to an end; I'm sitting here hoping that we'll pull over soon.

We come into a sharp bend and the car goes into a heavy skid; there's no room in our lane to pull out of it and we swerve into the oncoming lane. (S)He screams at me when I try and take control of the wheel. I can hardly bear to watch; there's a heavy lorry driving towards us at speed and we narrowly miss a head-on collision with it. (S)He pulls the car over onto the side of the road and we sit here in silence. After what feels like an eternity I ask her(him) what (s)he wants to do now; (s)he asks if I'll come home with her(him) so that we can have a better end to the night. She doesn't usually let me drive, but I don't want her(him) to drive any further tonight; (s)he's upset and has had too much to drink, so (s)he and I agree to the following ground rule:

Figure 23. Notes from construction of the driving scenarios: Anxiogenic opening context.

Notes: *The scenario opens again at high speed, to create a sense of arousal and attempt to match the physiological arousal in happy and anxiogenic conditions. The thoughts, sounds, sights here are attempts to flood the senses with cues that might evoke happiness. Attempt to simulate what might be seen or felt whist driving, in unfolding scene, that might give rise to imagining that you are being driven in this car. Include content that draws attention, thoughts, eye to appetitive stimuli.*

Use the birthday celebration as an event that might evoke joy. Use the laughter, smiling, impulses to draw near, touch, play, and kiss that have been associated with joy within the content here. Attempt to present the other party and event as something that you want to retain contact with here, to prolong the occasion. Hint at something more exciting to come, to create anticipation of pleasure. Retain realism, take care not to suggest dangerous driving or other content that might evoke displeasure, unease within this condition. Focus on pure pleasure.

Use of 'I' has been reduced in this condition too, to improve what participants called the 'flow' of events (N = 20) in a rating task that was used to assess the emotional nature of the new materials. Frijda (2005) identified flow as being an important element of the first order experience of emotion. All materials (these and all of those developed for the new scenarios that were developed in this style to share conditionals and card arrays between emotion-as-content conditions, were rated in a task that repeated the procedure used in the last rating task). Too many 'I's were intruding with the realism of the event, and reminding that it was a story – participants said this made it feel less real, and spoiled the sense that it was real that was felt with the rest of the content. Offer a way forward in the agreement (q) that offers more pleasure.

Driving: Opening Context. I'm being driven along a dual carriageway by my girl(boy)friend at high speed and I'm feeling incredibly excited. I can see the blue cloudless sky through the windscreen; she's got the windows open to get some fresh air; it's warm and the sun is shining. There isn't much traffic on the road and she's driving amazingly; she looks incredibly sexy. We've been in the pub this evening celebrating her birthday, which I'd planned for last month, and she's delighted with me. She's smiling and laughing as we're driving along and I want her to stop the car and kiss me but she's not listening to me. I don't want this evening to come to an end and I'm sitting here hoping that we'll pull over soon.

We come into a sharp bend and the car goes into a slight skid; she's a fabulous driver and there's plenty of room to pull out of it as she rounds the bend. She laughs and screams at me when I pretend to try and take control of the wheel and then sit here with my hands over my eyes saying that I can't bear to watch. She pulls the car over onto the side of the road and leans over towards me. I ask her what she wants to do now, and she asks if I'll come home with her so that we can have a good end to the night. I really want a go at driving this amazing (*is 'amazing' a bit naff or lame?*) car but she doesn't usually let me drive, so I tell her that if she wants to please me she'll let me drive, and she and I agree to the following ground rule:

Figure 24. Notes from construction of the driving scenario: Happy opening context.

Notes: *The opening context needs to flatten from the high arousal attempts in the anxious and happy conditions: slow speed. Retain as much content as possible from the happy and anxious conditions, but change the adjectives, and focus – shift to mundane qualities, everyday features that might not attract particular attention, and will feel ordinary, not arousing, repulsive, threatening or attractive.* *Avoid creating event that you'd want to get away from, or prolong contact with. Avoid cues to arousal. Use adjectives that indicate flatness, ordinariness. Removed birthday from this condition – it evoked too positive a response in some participants during the rating (N = 20), who had happy memories of recent birthdays. Inclusion of the term seemed sufficient to evoke those memories, and some of the associated feelings.* *Keep the car skid, to retain as much content as possible across conditions, but soften this as did in the positive condition (slight skid). Reduce the play element that followed this in the happy condition, to flatten the mood in this condition.* *The slight positive elements are included here to balance against what are more boring elements (rating task feedback), in the attempt to prevent this from being an event that you might want to escape from (which is moving towards a more negative emotional response). Will need to test this version in a rating task with participants to see if the condition is 'neutral'.*	Driving: Opening Context. I'm being driven along a dual carriageway by my girl(boy)friend and I'm feeling tired. I can see the cloudy sky through the windscreen; she's got the windows open to get some fresh air into the car and I'm feeling a bit cold. There isn't much traffic on the road and she's driving steadily; she looks a bit bored. We've been in the pub this evening to have a change of scene; I thought it would be good to go somewhere different, so I suggested this trip. She looks happy enough as we're driving along although I want to talk about my day and she's not listening to me. I want this drive to come to an end and I'm hoping that we'll get home soon. We come into a bend and the car goes into a slight skid; she's a good driver and there's plenty of room to pull out of it as she rounds the bend. She pushes me away when I pretend to try and take control of the wheel and I sit here with my hands under my legs humming to the music that's playing. She pulls the car over onto the side of the road and stops for a rest. I ask her what she wants to do now, and she asks if I'll come home with her to round off the evening. She doesn't usually let me drive her car, but I've wanted to drive it for a while, so she and I agree to the following ground rule:

Figure 25. Notes from construction of the driving scenarios: Neutral opening contexts.

Notes: *The conditional 'rule' is here designed to represent an everyday agreement between friends (partners), that would be familiar and meaningful to participants – something that they might have experienced. Costs and benefits could be placed anywhere within this agreement. In this scenario, p is positioned as a precondition or cost that must be met by the co-agent or co-actor whose perspective will be adopted by participants in the first selection task; q is positioned as a benefit for them. P is positioned as a benefit or reward for the other party in this episode, and q as the precondition or cost that must be met by them in this exchange.*

P In the anxiety condition, might to represent a cost or a precondition, in happy, hard to see this as a cost, is a precondition here; in neutral condition, not clear whether a cost, but meets criterion of being a precondition

¬p In the anxiety condition, might offer a way of escaping anxiety and thus seem attractive, but perhaps does not remove difficulty that might follow (partner being upset) so may evoke anxiety too; in happy condition, no rationale for this behaviour provided, it seems to offer no reward, includes a possible cost (loss of reward offered in q); in neutral, this offers no obvious cost or reward.

q In anxiety, is a benefit that avoids a cost (i.e., partner driving, but is returning with partner a benefit? Might want to escape from this situation, it could be benefit that avoids greater costs – upsetting the partner?); in happy, is a benefit (something desired); in neutral, is a benefit (desired? driving is desired, but is returning with partner? Might need to test this on participants before the selection task, or measure within that task)

¬q need to ensure this does not offer better escape from situation in anxiety, or may be selected as more attractive option rather than looking for rule breaking (might rule breaking by other then be desired?), in happy, is this a cost? Difficult to determine, might be happy with this behaviour, although it breaks agreement. Need to assess in selection task.

Avoid the use of explicit negatives in the card array, but make it clear that not-p and not-q are not-p and not-q so that it is clear that they represent a breach of what was agreed (avoid alt-ps and alt-qs). Avoid illness, or more enticing or displeasing behaviours in not-p and not-q, to avoid disabling conditions.

Conditional Agreement:

If I agree to come back with her,
then she must let me drive us home

Card Array

p I agree to come home with her

¬p I tell her that I need to be elsewhere

Keep a little vague, to avoid attachment of emotion to location, and so that can functions as ¬p (like a negation?)

q

¬q She lets me drive us to her home

She drives us back to her home

She drives us back to my house? (perhaps will not function well as not-q, might imply change of plans?)

Figure 26. Notes from construction of the driving scenarios: Conditional agreement and card array.

5.2. Validation of Selection Task Materials

To determine whether any of these nine new scenarios might be suitable for use within the selection task, their effectiveness in inducing emotions was assessed in an empirical rating task. The purpose of this rating task was to determine whether any of the scenarios induced the targeted emotions within each of the three *emotion-as-content* conditions, and whether any scenarios induced any emotions that were not wanted within the first selection task studies, within any of their three *emotion-as-content* conditions. The ratings obtained from this task were used as a proxy for the emotional nature of the materials. Two rating task studies had been conducted whilst developing these nine new scenarios (*N* = 15, *N* = 20). As a result of those rating tasks and the development of materials that followed, it seemed possible that the materials that were rated in the task that is reported below, might be suitable for use within the first selection tasks. This rating task was conducted to determine whether further development of materials was needed before they could be used within the first selection task study.

5.2.1. Rating Exercise: A Test of the Emotional Nature of Task Materials

5.2.1.1. Method

5.2.1.1.1. Participants

Sixty postgraduate students (male *N* = 25, age *M* = 22.32, *SD* = 1.31; female *N* = 35, age *M* = 22.31, *SD* = 1.47) from the University of Leeds took part in the rating of the new selection task materials. Participants were obtained via an opportunity sample from the Schools of Psychology, Business, Medicine, Sociology, and Law.

5.2.1.1.2. Design and Measures

Nine scenarios in each of their three *emotion-as-content* conditions (*anxious*, *happy*, *neutral*) were assessed during this rating task (i.e., twenty-seven different scenarios in total, see Appendix 2 for these materials). The situations that were depicted in the nine scenarios were as follows: being driven in a car, a train journey, running down a corridor, sledging, dining in a restaurant, exploring a holiday home

on arrival, travelling to catch a plane, on board a holiday boat, and negotiating coursework. All nine scenarios contained pragmatic, prudential conditional agreements between friends or partners, which took the form of private social contracts. Both parties were represented within the conditional the card array items.

Participants rated one of the *emotion-as-content* conditions (i.e., *happy*, *anxious*, or *neutral*) within each of the nine scenarios. Twenty participants therefore rated each one of the versions that had been constructed during this phase. The order in which the scenarios and *emotion-as-content* conditions were presented was counterbalanced between participants. The selection of *emotion-as-content* condition from each scenario for participants was randomized, and so no two participants rated the same set of materials. The positioning of card array items (*p, not-p, q, not-q*) was also counterbalanced within scenarios.

In an attempt to avoid giving participants any hint that the scenarios had been created with the intention that they would evoke a specific emotional response, or any emotional response, participants were informed that they would be asked to report how they felt when reading nine different descriptions of events. This approach was adopted to avoid creating any expectation in participants as to what they might feel whilst reading through the scenarios, and thus to minimize bias within participant reports. Frijda (2009) argued that the best way to determine whether emotions were felt in response to any given stimuli, and what emotions they were, was to obtain reports shortly after an emotion had been felt, and to use 'free' self-reports, or a free—generation (i.e., self-generated feeling-labels) response format (see also e.g., Philippot, 1993). Although this method does not capture emotions in real time, because it relies on retrospective reports of what was felt, the aim of obtaining data in this manner is to avoid limiting and defining felt emotions in terms of the adjectives contained within emotion rating scales. This was the method used to obtain participant ratings in this task. Instructions for the self-generated feeling labels were adapted from the Positive and Negative Affect Scale (PANAS, Watson, Clark, & Tellegen, 1988), and they were piloted (N = 12) prior to use within this rating study to ensure participants would understand what was being asked of them in the task.

5.2.1.1.3. Ethics

Ethical clearance for conduct of this study was obtained via the self-certification scheme from the Institute of Psychological Sciences Ethics Committee at the University of Leeds (Reference No. 08208-01). The design and conduct of this study adhered to the British Psychological Society's (BPS, 2014) code of Human research ethics.

5.2.1.1.4. Procedure

Participants were recruited from within the postgraduate population at the University of Leeds, by asking them to participate in a rating task in which they would be asked to read through descriptions of nine different events, and to then describe what feelings they had when reading each of these descriptions. Participants completed the task in groups of twelve, within the School of Psychology at the University of Leeds. Informed consent forms were completed by participants before the start of the rating task (this is presented in Appendix 3). Task instructions were then read aloud to participants to ensure that they understood the instructions, and how they should use the rating scales (full task instructions are presented in Appendix 4). Participants were then asked to read through the instructions before starting the task. The instructions read as flows

> Instructions
>
> On the following pages you will find 9 individually presented scenarios. Each scenario includes an episode description that concludes with an agreement between the two people in the scenario. Each agreement takes the form of a ground rule. Following the agreement are four pieces of information that represent possible outcomes or events that might follow.
>
> Your Task
>
> Please read through each scenario at your normal reading speed and then rate each scenario on the dimension detailed below. Read through the first scenario and provide your ratings for this scenario *before* reading through and rating the second scenario. After you have read through and rated the second scenario, move on to the third and so on.
>
> Do *NOT* spend too long thinking about your answers when rating these materials; it is your first answers or those that come easily to mind that I am wanting within this exercise. There are *NO* right or wrong answers to these questions; it is vital that you give *YOUR* feelings in your answers to the items within this booklet. I am seeking to understand what feelings are evoked by these materials when YOU read through them. This is not a test. Please be as honest and accurate as possible in your responses, and try

to respond to each of the questions enclosed. This task should take about 40 minutes to complete. The answers provided by you within this session will not be used or stored in any way that would link your identity to them.

Rating Exercise

Please read the following rating exercise instructions and ensure that you understand what is required of you before beginning this exercise. You can refer to these instruction pages throughout this exercise.

Thank you for your time and assistance.

1. Read through the scenario ***one section at a time*** (episode, then ground rule and then all four potential episode outcomes), and then indicate how you felt when reading through each section by describing the two *KEY* or most intense feeling(s) or emotions you experienced. Read and rate each section *before* reading through and rating the following section. Use single words or phrases to describe the feelings evoked. Place each key feeling in one of the spaces provided, and indicate on the scale placed below your feeling the Intensity of the feeling evoked (0 = Not at all, 50 = moderately, 100 = Very Strongly).

2. After you have rated each section of a scenario, please indicate how you felt when reading through the scenario as a whole. Again, use single words or phrases to describe the feelings evoked. Place each key feeling in one of the spaces provided, and indicate on the scale placed below your feeling, the strength of the feeling evoked.

On the following page you will find an example scenario and an example of the rating format being used in this exercise.

(cut to next page)

Example Episode Description

Ground Rule

If I agree to come back with him, then he must let me drive us home

Potential Outcomes

1. I agree to come home with him
2. I tell him that I need to be elsewhere
3. He lets me drive us to his home
4. He drives us back to his home

'Whilst reading through this episode I felt: (*insert feeling here*) '

(Intensity = 74)

The scale provided ranges from '0 *no feeling at all*' to '50 *moderately'* to '100 *very strongly*'; these descriptions refer to your given feeling in terms of the intensity to which this was felt. Please select the number (between 0 and 100) that best represents how intensely you felt each emotion described. Please read through each episode description carefully as these differ across scenarios.

> If you cannot provide two/three feelings for each section, then provide as many as you can in the spaces below. The spaces are provided for you to indicate your key responses to these scenarios. If no feelings are evoked whilst reading through any of these sections, then please indicate this in the space provided.
>
> Once again, do not think too deeply about your response; I want you to indicate what *feelings* were evoked when reading the specified sections.

Participants provided short descriptions (using single words or short phrases) of the most intense feelings that were experienced whilst reading each scenario section (opening context, conditional agreement, and each of the 4 episode outcomes, which depicted the behaviours that would be displayed within the selection task card array, *p*, *not-p*, *q*, and *not-q*). Ratings were obtained for the opening context, conditional and card array items to investigate what emotions were evoked by each of the sections. If the conditionals and card array items evoked different emotions than the opening contexts, which were not intended to be evoked within the *emotion-as-content* condition, it would be important to know what they were. The materials might be adjusted to remove unwanted emotional responses, if possible. If their removal was not possible, it would be important to consider what influence they might have on behaviour when assessing future responses to these materials in future investigations with these selection tasks. Overall feeling responses to each scenario condition were reported after each of the sections within each scenario version had been rated. Participants provided up to three separate feeling-labels per section and described the strength of feelings evoked on visual analogue scales (100-mm), which were placed alongside each feeling description. After completion of the rating task, participants were debriefed as to the purpose of the task.

5.2.2. Results

5.2.2.1. Data Analysis Method

A summary of the feeling labels that were obtained within this rating task are displayed below in Tables ten to eighteen. The feeling label summaries that are provided in these Tables contain all the emotions that were attached to the scenarios in the rating exercise: to the opening contexts, conditional agreements

and card array items. The mean intensity ratings of emotion labels are provided in brackets. The range of labels shown within these Tables does not give any indication of which of these were the most frequently applied label within the task. Where there are few labels attached to any component, these elements received a much narrower range of emotion labels; some received only emotion labels, others also received labels that were not classifiable as being emotions (both kinds of label are included in the Tables).

The feeling label summaries have been presented here to give an overview of the emotional nature of the scenarios that were developed for the selection task, and to demonstrate some of the difficulties that were faced during data analysis. Several hundreds of the feeling-labels that were provided by participants in this task, were not clearly interpretable as being labels of felt emotions. The framework provided by Ortony et al. (Ortony et al., 1988; Ortony, Clore & Foss, 1987) was used as the predominant guide for analysis of the feeling label data, although other references were also consulted during this process (e.g., Alvarado, 1998; Frijda, Ortony, Sonnemans & Clore, 1992; Johnson-Laird & Oatley, 1989; Neidenthal, Halberstadt, & Innes-Ker, 1999; Sabini & Silver, 2005; Shaver, Schwartz, Kirson, & O'Connor, 1987; Storm & Storm, 1987) in an attempt to determine whether particular terms could be labelled as being 'emotions'. Participant response labels were collated within two feeling-label catalogues, one of which contained an alphabetical listing of all labels produced by participants; the other was organized by intended *emotion-as-content* conditions (happy, anxious and neutral) and scenario content location (i.e., opening-context, ground rule- conditional agreement, and card array positions). The second catalogue was realized in tabular form; raw data labels and intensity ratings were entered into tables that were compiled within separate documents for situation-context, conditional, each of the card array and overall ratings. Within the alphabetical catalogue listing, feeling labels that were exact duplicates were removed prior to categorization of labels into clusters. Initial clusters contained variations of lexical form only (e.g., anticipation, a sense of anticipation, in anticipation, anticipatory), and separate clusters were thus constructed for similar terms (e.g., worried, concerned, a sense of nagging, unnerved, apprehensive, unsettled). A total of five-hundred-and-sixty-

four clusters resulted from this initial analysis. Clusters were then positioned within higher-order categories (derived from Ortony et al., 1988). Terms such as lonely, *isolated*, *unloved*, *abandoned*, *weary* and *drained*, for example, were categorized as representations of 'distress'. This categorization structure was then used to classify responses within the second catalogue.

The categorization of terms such as *unloved*, *lonely*, *isolated* and *abandoned* as emotions is open to question. Ortony et al. (1987) argued that *being* abandoned, for example is not necessarily the same as *feeling* abandoned: one might *be* abandoned without *feeling* abandoned, and one can *feel* abandoned without having *been* abandoned; they used *feeling* to determine whether an emotion had been felt. As the participants had been asked to describe feelings within the rating task, these terms were taken to be indicative of how they felt. It is still open to debate whether such terms should be categorized as being emotions in this task, as many feeling labels were provided that did not seem to indicate any emotional feeling (e.g., *right*, *cold, she is wise*). Nevertheless, this is the approach that was adopted here. The emotional nature of materials that are selected for use in the first selection tasks from this process, will be assessed again within that task to determine what emotions might have been influencing card selection in that task.

Feeling-labels were divided into positive, anxiety-related, anger-related, dysphoric, other negative, neutral, and 'other' categories. These categories/ clusters were selected for several reasons; one, to allow classification of stimulus materials according to targeted emotional responses; two, to allow a reasonable differentiation between 'negative' emotional responses, and three, to allow identification of additional emotional responses that might be evoked by the materials, so that the possible influences of these on selection behaviours might be considered.

During this initial stage of data analysis, the 'positive' cluster was not differentiated beyond the criterion of representing positive emotional responses. This approach was taken because most of the 'positive' emotion terms obtained within this rating task seemed to be descriptions of joy, with a *very* small number of labels indicating other 'positive' emotional states (less than 20 in total). This was perhaps less than

ideal, as it provided for the possibility that contradictory emotional responses (in terms of response tendencies, which might differ according to strength of arousal perhaps) were contained within the same group. It was very difficult to separate high and low arousal descriptions of happiness, as happy was the most common description of this state. At times this label was accompanied by terms such as *elated*, *euphoric*, or *ecstatic*, and in these instances it might be assumed that *happy* was intended to signify a high state of arousal. At other times, the word *happy* was accompanied by terms such as *relaxed*, *contented*, and *at ease*, and in these instances it might be argued that the word happy was there meant to indicate a low state of physiological arousal. In other instances, the word *happy* was accompanied by no other indicator of what the term was intended to mean from the participant who used it. In these cases, the aggregate sense of what level of arousal was evoked across participants responses has been used to interpret what kind of emotions were evoked by the nine scenarios, and the elements within these, in this task.

In the absence of clear guidance as to how feeling labels should be classified, this provided a reasonable approach. The 'other negative' category provided a sum category of all feeling label responses that were not classified as anxiogenic, anger-related or dysphoric (e.g., uncomfortable, guilty, ashamed, horrible, awkward). Response labels that expressed either physical states (that could not be interpreted psychologically, using the '*being*' *vs*. '*feeling*' distinction provided by Ortony et al., 1987, such as ravenous and drunk) or expressions of feelings that were judged to be 'unclassifiable' within this framework at the present time (e.g., *bizarre*, *fickle*, *action is weak*, *action should work*, or *truth*) were positioned within the 'other' category during analysis. Separate summary tables of feeling labels and associated intensity ratings were constructed for opening contexts, conditionals, card array items and overall ratings.

Table 10. Dining feeling labels by *emotion-as-content* condition.

Emotion	Feeling Labels
Happy:	excited (73), happy (80), happy/ secure (96), pleased, glad (77)
Opening	aroused (86), anxious (good) (57), sexy (94), a sense of fun (66)
Context	accepted (64), like a princess! so real, could relate to it, cosy, special (62), intimate, loved, wanted (76)
Conditional	at ease (75), very happy (97), nervous (53), in agreement it was fair (54), fine (80), acceptable
p	at ease (56), proud (72), happy (58), excited, very happy (97) looking forward to it, nervous (48), accepting (58)
Not-p	happy (76), pleased (79), unstressed, anxious (66), annoyed (24) okay
q	excited (58), pleased (60), happy, very happy (94), relieved (60) fine, something good
Not-q	miffed (67), angry (70), upset (73), hurt (80), furious (89), jealous (64), ashamed (64), awkward (44), it's not fair, unconfident, ambivalent, serious, not happy, used, wary
Anxious:	shy (86), nervous (89), anxious (79), apprehensive (63), on edge (55)
Opening	uneasy (44), not at ease (57), uncomfortable (72), annoyed (64)
Context	intimidated (64), out of place, unloved, can imagine it
Conditional	it's a reasonable rule, in agreement, vulnerable (64), pleased (54) embarrassed (62)
p	pleased (68), proud (73), nervous (37), scared (43), relieved (43)
Not-p	unhappy (49), irritated (65), not a good outcome, unfair, bad, tough, very poor
q	Relieved (86), thank God! pleased (72), anxious (40), nervous (54), upset (72)
Not-q	pissed off (97), irate (89), annoyed, angry (93), resentful (65), used (67) humiliated (98), upset (79), inadequate, unloved
Neutral:	excited (72), happy (34),
Opening	bit on edge (18), apprehensive, nervous (32)
Context	not at ease (28), uneasy (41), uncomfortable (77), comfortable (68)
	out of place, fine, secure in myself, don't want to compete,
Conditional	happy (59), glad (57), content (56), uneasy (19), in agreement, that's fair
p	not at ease (65), okay, good, happy (31), seems right, fine, fair
Not-p	apprehensive (60), annoyed (31), sad (22), good, okay, fine
q	pleased (29), fine (57), happy (42), slight apprehension (36)
Not-q	a twit, annoyed (51), miffed (61), hatred (72), threatened (68), challenged, ignore him and leave! (57), low self-confidence (68)

Table 11. Sledging feeling labels by *emotion-as-content* condition.

Emotion-as-Content	Feeling Labels
Happy: Opening Context	euphoric (82), ecstatic (78) joyful (83), happy (84), happy for them (93), enjoyment (70), contentment (84), fun (75), pleasant anticipation (67) carefree (80), calm (71), jealous at them being on holiday (76) quite attached, attracted to my girlfriend (62), impressed real, I could relate, familiar, I want her to stay, I could visualise this, I've been her
Conditional	moderate, okay, good, confident it will work (87), certain (99), at ease (74), happy (87)
p	happy (82), amused (73), flirtatious (62), protective (65), caring (60), it's expected, unsurprised (50), okay, good
Not-p	amused (35), at ease (74), fine (50), pleased (74), indifferent (54), relief (97), safe (69)
q	expectation, intrigued, excited (64), happy (82), at ease (56), glad (83), pleased (85)
Not-q	anxious (17), disappointed (24), self-centred, selfish (90), rude (84), risky, confused
Anxious: Opening Context	anxiety, anxious (81), fear (93), terror (68), anxious, apprehensive, a sense of impending doom (79), uneasy, unnerved (99), uncomfortable (60)
Conditional	absolutely agree, accepting, worried (70), frustrated (64), unhappy (65), relieved (78), reassured (82), concerned (60), pleased (89)
p	accommodating, friendly, relief (88), good (65), fear (34), worry (77), anxious (26), concerned (79), calm (66)
Not-p	Relief (71), good, happy (60)
q	confident it will work out, pleased (48), relieved (87), calm (55), frustrated (74)
Not-q	miserable (75), upset (80), lonely (28), irritated (58), irksome (50) disappointed (95), sympathy for her (79), sad (98), resigned (62) a bit violent
Neutral: Opening Context	indifferent, little feeling? nothing much, normal, not a lot, nothing slightly uneasy (50), bored, boredom (22), fed up (8), ambivalence (40) neutral, fine
Conditional	fine, happy (81), comforted (94), seems fair, normal, alright, neutral,
p	okay, fine, good, obliged, responsible, happy with it (79), fair
Not-p	not sure, this is wrong, mixed feelings, foolish, odd
q	mildly happy (12), glad (62) indifferent (84), good, unsurprised, helpful
Not-q	slightly frustrated, awkward, uncomfortable, reckless, fed up (90)

Table 12. Lodge feeling labels by *emotion-as-content* condition.

Emotion-as-Content	Feeling Labels
Joy: Opening Context	excited (88), happy (86), euphoria (87), delighted (79), pleased (82), thrilled (74), amused (99), very happy (92) content (87), relaxed (90), liberated, giddy (89) realism (83), more upbeat, lucky, privileged (84), escaping envy - wish I was there (80), like I was somewhere else
Conditional	positive, game on! excited, happy (74), expectant (77), it was fair (81)
p	selfless, fair (74), good, happy, pleased (51), excited (71), content (79), impressed (68), relieved (49)
Not-p	stressed (52), not good, fine (63), happy (52), dissatisfied (60), unhappy (66), upset (53), guilty (71), disappointed (75), annoyed (56)
q	pleasant anticipation (71), looking forward, excited (92), want to know what happened next, satisfied (82), content (76), envious (84), glad (56), happy (80)
Not-q	sad, tricked, not pleased, unhappy (71), annoyed, little empathy, guilty (54)
Anxiety: Opening Context	unease, perturbed (73), tense, stressed (78), unhappy (61), apprehensive, worried, nervous (79), unsettled (71), disconcerted (73) negativity (94)
Conditional	intrigued, anticipating a solution, this is fair, good, fine, fair, happy (84), content (77), satisfied (89), content (82), worried (50),
p	reasonable, fair, okay, fine, happy (50), satisfied (77), content (63)
Not-p	unreasonable, guilty (39), stressed (48), tense (69), unsettled (39), upset, unfair
q	relief (38), satisfied (73), less stressed, appreciative, happy (72), content (74), satisfied (73), excited (66)
Not-q	annoyed (70), exasperated (97), alone (61), worried (64), upset (72), small (61), sympathy, awkward, rejected
Neutral: Opening Context	content (51), okay (40), happy, happy with friends (28) not much, fine, nothing much disappointed with the place (38) bored (69), ordinary, normal, disinterested (70) intrigued, informed, realistic, a bit far-fetched
Conditional	organized, should work, fair, mutually beneficial, happy (73)
p	fine (28), good, normal, content (44), happy (21)
Not-p	unsympathetic (84), unmoved (76), no problem, seems fair
q	happy (42), content (43), excited (59), satisfied (73), good, fine
Not-q	concerned, disappointed (61)

Table 13. Driving feeling labels by *emotion-as-content* condition.

Emotion-as-Content	Feeling Labels
Joy: Opening Context	excited (91), exhilarated (100), content (100), happy, happy thrilled, really happy (82), delighted, elated, euphoric, ecstatic (83), horny (91) tense, contented, good, quality alive, attracted to her, fun, special, this could happen to me, very real, I could imagine this, this is so true, feels familiar
Conditional	confident, excited (83), aroused (87), very happy (99), give me the keys!, content (72)
p	excited (67), enthusiastic (93), happy (95), good, horny (92), result! (92), in control (78)
Not-p	crazy, insincere, angry (100), annoyed (82), frustrated (93), upset (100), rejected (100), lonely (83), pleased (86), guilty (33), relieved (95)
q	pleased (89), happy (95), contented (100), wanted, desired, loved (96), result! yes,
Not-q	worried (100), gutted (100), disappointed (98), dissatisfied (99), betrayed (100), depressed (70), annoyed (95), frustration (96), let down, no way! she lied! used
Anxiety: Opening Context	worried (89), scared (91), nervous (98), anxious, tense (100), uneasy (88), dread (84) get me out of here! unsure what will happen, so real, true, similar to what one would experience, can believe this
Conditional	out of control, worried (50), okay, should work, fair, wary, happier (50), relieved (50), pleased (60), in agreement (50)
p	proud of myself, pressured, pleased (64), nervous (62), tense (62)
Not-p	guilty (66), bad (ashamed) (50), unwise
q	safer, better, good, okay, worried (46), unsure, pleased (84), relieved (50), nervous (70), tense still (55), thank God, about time
Not-q	cheesed off (93), annoyed (95), angry (91), sympathy (100), harsh, f*** that! gutted, undermined, it's unfair, want to leave (99)
Neutral: Opening Context	relaxed (50), bored (80), unexcited (20), ordinary, mundane okay, fine, this is normal, not much, unmoved scared (20), tired, weary (18), bored (52)
Conditional	no worries, seems fair, sensible, good, happy (40), satisfied (63), cool
p	reluctant to go home with him (18), okay, fine, good, fair
Not-p	no problem, fine, okay, not bothered, tired
q	unease (21), fine, no problem, expected, good, fair, happy (50)
Not-q	lonely (73), resigned (58), worried, fed up! pissed off (74), angry (76)

Table 14. Train journey feeling labels by *emotion-as-content* condition.

Emotion-as-Content	Feeling Labels
Joy: Opening Context	elated (92)[28], excited (78), happy, very happy, happiness (84), anxious – nice (72), fantastic (74), contented (57) great, glad to be alive, feels wonderful
Conditional	great, this is good, alright! excited (68), happy (96)
p	cool, good, happy (73), anxious (22), excited (82), relieved (75)
Not-p	nothing, relaxed (88), happy (74), excited (17)
q	overjoyed (98), delighted, happy (83), yes!, so excited (94), delighted (68), relieved (76)
Not-q	pissed off! (75) sulky (49) disappointed (32)
Anxiety: Opening Context	anxious (72), apprehensive (75), stressed (83) sadness (49), upset (73) like life, realistic, normal
Conditional	well planned, good, uncertain, relieved (64), happy (41)
p	anxious, worried, nervous (61), happy, glad, pleased (65),
Not-p	bad (90), odd, angry, irate, irritated (69), worried, nervous (89)
q	happy about seeing her, happiness (77), anxious (94), relieved (79), excited (34)
Not-q	guilty (81), sad (74), miserable (88), not happy, at unrest (74), awkward (93), disappointed (78), outrage (86), anxious (56)
Neutral: Opening Context	excited (40), happy (36), anxious (27), good nervous (16) intrigued, happy for their meet (43)
Conditional	okay, fine, sounds sensible, neutral, that's okay, relaxed, nothing, good (65)
p	good, fine, happy (50), warm, pleased (22), excited (27)
Not-p	bad (89), not good, seems odd, fine, okay, no real feelings
q	happy for them (32), pleased (54), nothing much, it's expected, okay with it
Not-q	slightly frustrated (41), irked, irritated (48), anxious (55)

[28] This mean was inflated a little by one participant's score of 111 (on a 0-100 scale).

Table 15. Leave Feeling labels by *emotion-as-content* condition.

Emotion-as-Content	Feeling Labels
Joy	excited (87), happy, pleased (84), amused (69), exhilaration (92)
Opening Context	nostalgic, alive, I could relate to it, adrenaline running through me, butterflies in my tummy, free, loved, smug
	realistic, like I was there, similar to what I've experienced, I could relate to it, could visualise this
Conditional	happy (78), good, positive, expectant (73), pleased (58), excited (80)
p	content (72), happy (76), excited (82), glad (71), fine (50)
Not-p	bored (50), worried (33), unhappy (73), annoyed (84), unsure (70), horrible
q	wanted, amused, happy (84), glad (72), pleased (58), sad – wanted more (59)
Not-q	worried (63), irritated (49), annoyed (76), weird, concern
Anxiety: Opening Context	scared (64), anxious (79), worried (82), concern (68), unsettled (78) unnerved (84), a sense of nagging (81), trapped (99)
Conditional	hopeful it goes to plan, okay, good, glad (65), nervous (78), anxious (75), worried (63), panicked (70), pessimism
p	relieved (20), concerned (64), happy (42), ok
Not-p	irritated, angry (68), upset (84), worried, anxious, nervous (72)
q	reassured (49), safer, a bit better (29), happy (58), uncertain (78) worried (84)
Not-q	pity (50), annoyed at friend for leaving (73), angry (71), annoyed (73), perturbed (64), anxious (73), worried (64), nervous (84), helpless (68)
Neutral: Opening Context	happy (48), okay, fine (50), tired, bored (66) reminiscent (66), unsure, nothing to worry about (50)
Conditional	fine, okay, mundane, not much, normal, works well, bored (60), good (52)
p	predictable (83), ok (50), pleased (48), bored (37), pleased (58)
Not-p	fine, okay, nothing, good
q	bored (50), happy (58), glad (47), okay, seems fine
Not-q	concerned, anxious (72), sad (31), annoyed, angry, irritated (22)

Table 16. Coursework feeling labels by *emotion-as-content* condition.

Emotion-as-Content	Feeling Labels
Joy: Opening Context	relaxed (44), happy (76), friendly (85) jealous (43), envious she finds it easy (63) cool, good, confident, she is self-centred
Conditional	cool (81), thankful (50), good, works well, realistic, fair, more give than take, she is using her
p	happy (87), kind (67), caring (76), thankful (60), cool (79), easy (94), relaxed (65), jealous (52) helpful, nice
Not-p	risky (84), mean, unfriendly (50), normal (84), standard (97), sensible (83), sympathy (50), selfish (62), fair (81)
q	satisfactory (50), dangerous (56), generous, nice, works well, thankful (89), truth, disbelief
Not-q	this is weak-willed, accepting, she is manipulating, boastful she should be empathic, a bit angry (68), frustrated (69), annoyed (59)
Anxiety: Opening Context	nervous (50), anxious (45), stressed (63), scary for her (61) bored (59), little stimulation cute, daring, it is focused, empathic (69) caution (58), pressure (76)
Conditional	this is a confident thing to do, forced, coerced, potential for things to go wrong, suspicious, doubtful, trickery, forceful
p	pressured (89), relieved (70), picky, nice, fine, okay, helpful
Not-p	guilty (78), ashamed (84), embarrassed (56), dull, horrible, cool, harsh
q	fair (81), relaxed (58), pleased (60), amicable, reasonable, cool,
Not-q	irritated (97), sympathy (98), angry (86), not surprised, to be expected, a waste of time (74), this is self-centred, pointless (76)
Neutral: Opening Context	lazy (78), relaxed (75), happy (22), calm, content (31), little feeling normal, fair, lack of opinion, complacent (76), intrigued nice toward the end, pointless at beginning, ok (87)
Conditional	ready to move on, fair (84), good, fine with that, obliged, makes sense
p	correct thing to do, reasonable (64), it was okay, fine, happy (48)
Not-p	unrealistic, far-fetched, no truth in it, odd, okay
q	fair action, reasonable, little feeling, normal, good, right, pleased (75), happy (89)
Not-q	demotivated (62), waste of time, not surprised, annoyed, angry (48)

Table 17. Travelling to catch a plane feeling labels by *emotion-as-content* condition.

Emotion-as-Content	Feeling Labels
Joy: Opening Context	excited (64), happy (76), nervous (32), anticipatory (79) there is energy, there has been preparation, confident (68) neutral (50), aware of cost of this, feels familiar, interested, they are lucky
Conditional	hopeful (70), secure (57), thoughtful, it's fair, fine
p	pleased (60), hopeful they'll follow the rule (69), content (63), good (49)
Not-p	happy (63), safer (48), satisfied (60), anxious (74), unsure what will happen (62), confident (51)
q	actions were fair, anticipatory, good, happy (68), pleased (69), cheerful (65), fair (61), worried (13)
Not-q	nervous (28), annoyed (58), irritated (64), frustrated (59), disappointed (62)
Anxiety: Opening Context	nervous (58), worried (51), tense, stressed (59) unhappy (36), anxious (74), concerned (72), hope it's worth money, familiar (78), empathic (83)
Conditional	pleased (57), happy (74), content (64), it seems necessary, confident this will help, doubtful it will be followed (65)
p	nervous (52), okay, accepting, happy (42), pleased (69), anxious (34), irritated (26), hopeful (78), good
Not-p	why is she doing this! fine, annoyed, angry, irritated (74), sad, upset (85)
q	excited (50), happy (74), stressed (71), worried (73)
Not-q	trip is not a good idea, why is she going! angry (61), annoyed (75), pissed off (69), frustrated (77), disappointed (74), agitated (60)
Neutral: Opening Context	stressed (51), worried (58), slightly anxious (24), happy (29), irritated (19), bored (78) silly, rushed, tense, comfortable interested, too much detail, eager for it to work
Conditional	hopeful it will be worthwhile (71), fair, fine, good, okay, confident, satisfied
p	okay, good, happy (23), pleased (12), fine, normal, seems right
Not-p	impatient (50), interested (64), fine, okay, nothing
q	pleased (63), happy (54), cheerful (59), hopeful (12), content (32), worried (13)
Not-q	frustrated (41), tense (63), irritated (36), sad (36), stressed (51)

Table 18. Travelling by boat feeling labels by *emotion-as-content* condition.

Emotion-as-Content	Feeling Labels
Joy: Opening Context	excited (86), happy (66), at peace (62), content (89), relaxed (90) organised, warm, expectant, carefree (97)
Conditional	anticipation of something good (53), neutral (50), ok (74), content (61)
p	happy (62), relaxed (75), satisfied (83), relaxed (62), excited (36)
Not-p	disappointed (64), sulky (72), annoyed (42), relaxed (50), content (41)
q	happy (74), relaxed (80), excited (39), good (51), anticipation (75) content (98)
Not-q	disappointed (74), irritated, angry, annoyed (58) chaos on its way, that was silly
Anxiety: Opening Context	agitated (70), anxious (69), nervous (61), rushed (81) edgy, tense, unsettled restless, uneasy (69), unhappy (63) chilly, cold, crowded, hot, rushed, wary (77), uncertain (62)
Conditional	reassured (64), safer (65), pleased (69), anxious (74)
p	more content (64), potentially reassured (46), edgy (59), wary (60), relaxed (59)
Not-p	illogical, not right, mean, bizarre, not true,
q	more at ease (38), safer (76), reassured (65), anticipation (54), relaxed (71), at peace (74), pleased (65), satisfied (77), excited (40)
Not-q	unhappy, unsettled (63), anxious (75), hoping for a solution (74), annoyed (92), trapped
Neutral: Opening Context	content, calm (68), relaxed (81), happy (62) restful (69), looking forward to something nice, not much, neutral, bit cold, tired, should be a good day (61)
Conditional	fine (65), happy (19), good, right, fair, reassured (57), okay with this
p	looking forward to something nice (82), good (54), happy (28)
Not-p	neutral, fine, nothing
q	fine (65), happy (36), excited (43), good (51), anticipation (75)
Not-q	annoyed (42), anxious (34), irritated (49), nothing, predictable, upset (52)

5.2.2.2. Perspective Adopted During Rating

Participants in the rating task were not given any instruction on what perspective to adopt when they read the scenarios; they were asked to read through the scenarios, and then to describe how they felt when reading the different sections.

In hindsight, it might have been better to ask them to adopt a specific perspective, so that feeling labels could be anchored to that perspective, even if imperfectly in practice if participants strayed from that perspective within the task. However, this lack of direction highlighted the importance of perspective in influencing emotional responses to events. From the labels provided, it seems possible that many participants switched between imagining themselves in the events described within the scenarios, and then distancing themselves from the actors described within them (e.g., labelling behaviour in the ground rule with '*I feel confident this will work for them*', and describing feeling *guilty* in response to either the *not-p* or *not-q* outcome, or responding with '*what are my friends doing!*'). Distancing oneself from emotions might be a technique adopted to regulate emotions (e.g., Nook, Schleider & Somerville, 2017), and so it is not clear what prompted what seemed to be more or less detached language used in some of the feeling label reports. The labelling in many cases seems to provide descriptions of how participants felt, rather than how they thought the actors-agents might feel in the scenarios, although it may be that the ratings included both their own responses to events and how they imagined they might feel in the situations described within the scenarios. Many labels were accompanied by explanations for their feelings that suggested an immersion within the story when reporting stronger feelings such as *euphoria* or *guilt*, and so it was possible to pinpoint in those instances what the feelings seemed to be about. The position participants adopted when they were immersed within the scenario was also influenced by the gender of the partner within the scenarios; participants seemed to adopt the perspective that was appropriate for their gender preference of partner. Participants who seemed to prefer a female (or male) partner, adopted the position of the male (or female) partner within the scenario; the couples in the scenarios were heterosexual. This influenced where the participant and their imagined partner were positioned within the card array, and importantly here, how they responded to the behaviours represented within those positions. *Not-p* and *not-q* represented a breach of the agreement by either themselves or their partner; if by themselves, it seems they might feel *bad*, or *guilty*, about their own behaviour and *anxious* about what their partner might do in response. Perhaps also *angry with* and *disappointed in* themselves, but it was difficult to determine from the data

who these latter feelings were directed towards. If the breach of agreement was by their partner, they seemed more likely to report *disappointment*, *anger* or *sadness* about their partners behaviour, and *anxious* about what that might mean for their relationship unless they were keen to get away from that relationship. Perspective determines which behaviours constitute a breach of the agreement within these selection task versions; they have been developed to allow for the investigation of perspective shifts, and so contain bilateral rather than unilateral cheating options. The change in emotional responses to card array items here, in line with perspective, highlights the importance of measuring these factors in any investigation that seeks to understand the influence that emotion might have on representation, information processing and behaviour.

5.2.2.3. Emotional Responses to Conditional Agreements and Card Array Items

Opening Contexts

The opening contexts of the happy and anxious scenarios received the most uniform emotional responses; the labels applied here were mostly of the emotional type targeted. Response to the scenarios that were intended to be 'neutral', however, varied a little more within and between participants. Some participants seemed to regard these scenarios as being neutral (using labels such as *nothing much*, *bored* or *little feeling* to describe how they felt), other participants described feeling mildly *happy* or *uneasy*. This was particularly true in the scenarios that were not used in the selection task (the criteria used to select scenarios for that are outlined a little later in this chapter).

Conditional Agreements

Emotional response to the conditional agreements seemed to be a little less intense than they had been to the opening contexts. Within the happy scenarios, emotional responses were consistent with the opening scenario; similar emotion labels were used to express feelings for the two events (i.e., *happy*, *pleased*, *excited*). Responses to the conditional agreements within the anxious *emotion-as-content* condition tended to be *happy* and *relieved* or a little *anxious* about what might happen next. Some relief from anxiety was thus provided by the conditional

agreement. Responses to the conditional agreements in the neutral condition were much more muted; participants were more likely to report feeling *fine*, or *okay* with what had been agreed.

Responses to p

The pattern observed in responses to the conditional agreement, was largely observed in responses to *p*. Within the happy condition, most participants expressed being pleased, happy or excited by this behaviour. One or two participants in this condition occasionally reported feeling a little anxious in response to *p*. In the anxious condition, participants mostly reported feeling a little anxious or relieved about *p*. In the neutral condition, participants were generally moderately *happy* about *p*, or felt *fine* about that behaviour.

Responses to q

Responses to *q* were similar to responses to *p*; in the happy content conditions, participants expressed mostly joy, pleasure and excitement about the behaviour represented in q. Occasionally, some participants in this condition reported feeling relieved. In the anxious content conditions, most participants reported feeling happy *and* relieved or safer or better *and or* anxious about the behaviour represented in *q* (about what might happen next). Reponses to *q* in the neutral condition were a little more intense than they had been to other events before this behaviour; reported happiness about this outcome increased a little in intensity.

Responses to not-p and not-q

Responses to *not-p* and *not-q* were similar, and they seemed to switch a little according to the perspective adopted by participants in their reading of the scenarios. Across *happy* and *anxious emotion-as-content* conditions, participants reported feeling *anxious*, *irritated*, *irate*, *sad*, *guilty*, *ashamed*, *displeasure*, *rejected*, *disappointed*, *relief*, *amused*, *happy*, *unsympathetic*, and *indifferent* about the behaviour represented in *not-p* or *not-q* (this list is not comprehensive, but it gives a good idea of what was felt about these behaviours in this task). Responses to *not-p* in the neutral condition were more muted, but they contained some variations that echoed the above pattern. Responses to the behaviour represented in *not-q* in the neutral condition were more intense across scenarios; the most dominant

responses in this condition were reasonably intense levels of *anger* (with an average felt intensity of *c*. *50* to *75*).

5.3. Selection Task Materials for Study One: The Selection Process

5.3.1. Selection Criteria

Six situation-contexts were required for use in the first selection task study with the new selection tasks; if differences were observed between *emotion-as-content* conditions within that task, and only one or two situations had been used to obtain those differences in card selection patterns, it might be argued that something specific to those scenarios had resulted in the observed differences. If six different scenarios were used within the first selection task, it would be more difficult to argue that any observed differences between *emotion-as-content* conditions could be explained by the oddities of one or two situations. The following criteria were developed to determine firstly, whether six of the nine situation-contexts provided adequate vehicles for investigating the possible effects of emotion on selection patterns; and secondly, which of the nine provided the best stimuli to either happiness, anxiety or the neutral content conditions. Given the preceding discussion of the nature of emotional responses to conditional agreements and card array items in the rating task, participant ratings of the opening contexts had to meet these criteria in all three *emotion-as-content* conditions within a scenario, for that scenario to be selected for inclusion in the selection task. If it seems possible that minor changes to any *emotion-as-content* condition might allow a scenario to meet the inclusion criteria, that scenario would be set aside for possible inclusion in the first new selection task study.

Twenty participants provided feeling labels for each *emotion-as-content* condition within each scenario within the rating task. A minimum of 18 of the twenty participant (90%) categorized feeling labels must be representative of the intended emotional response to conditions (i.e., include feeling labels for that emotion, and not include feeling labels that indicated a different emotion). The highest emotional intensity rating from each of these 18 participants must be equal to or greater than seventy within the happy and anxious conditions. Contra emotion intensity ratings

must be equal to or less than fifty. The feeling labels for the 'neutral condition, which is perhaps now more accurately labelled as the low-emotion condition, should contain no high intensity emotion labels (e.g., *euphoric*, *anxious*, *dread*, or *delighted*), that receive an intensity rating or more than 30, and not more than one high intensity feeling label per scenario. Intensity ratings of 50 or 80 for labels such as *relaxed*, *not much*, and *at ease*, make it difficult to construct a valid intensity ceiling in this condition that would apply usefully across all labels, and so this method was adopted in place of that strategy.

The lowest intensity condition-appropriate feeling labels within the higher intensity happy and anxious conditions, must be above 50, to ensure that the conditions sit above the mid-point of the intensity scale (in the rating task, which was 0 to 100). If any of the scenarios that meet these inclusion criteria contain ratings for the conditional or card array items that indicate potential difficulties, such as a lack of uniformity between conditions, or extreme responses to elements that are peripheral to the main agreement, these should perhaps be adjusted before using the materials in the selection task (e.g., the restaurant scenario contains extreme anger responses to a peripheral character in that scenario, who is not involved in the agreement. That response seems to interfere with emotional responses to the agreement and subsequent card array items, and so it seemed wise to reduce the perceived threat posed by that character within described events).

5.3.2. Materials for The First Selection Task Study: Six Scenarios

Six of the nine scenarios met the criteria that had been determined for use of them in the first selection task study; these were the scenarios that depicted events whilst driving, dining in a restaurant, on a train journey, sledging, running along a corridor and arriving at a holiday home. Several adjustments to these scenarios were made after their selection here for inclusion in the selection task, to attenuate elements within them that might influence participant responses unevenly within *emotion-as-content* conditions in the selection task. The dining scenario contained a third character who was peripheral to the agreement, who had evoked strong anger responses from participants in the rating task. The train journey scenario contained a reference to a serious illness that evoked unwanted emotions in

participants, and so this element was attenuated after the rating task. Responses to the conditions that were intended to be neutral were a little higher than desired. After these scenarios had been adjusted to attenuate these features, the emotional nature of the scenarios was assessed again, in a smaller rating task.

5.4. Adjustments to Selection Task Conditional-Contexts Post Selection.

After revision of the materials, twelve postgraduate students within the School of Psychology were used to assess their emotional nature. This task was conducted to provide a measure of whether the potential difficulties had been removed or whether they might still influence behaviour within the selection task. The rating task was also intended to provide an additional gauge of whether the scenarios would function as effective stimuli to the intended emotional responses with the selection task. Each of the six scenarios were rated by participants in only one of the *emotion-as-content* conditions, to avoid possible carry-over effects between different *emotion-as-content* conditions in which the same agreement and card array items were used. Participants reported their emotional state after reading each of the six scenarios, to the opening context, conditional and card array behaviours, using the revised DES scale (Izard, 1977; Izard, Dougherty, Bloxom, & Kotsch, 1974) and free response emotional labels. Each version of the six scenarios was therefore rated by four participants.

To allow their inclusion within the selection task, it was decided that a minimum of three of the four participant responses to the opening contexts must be representative of the intended affective response within that condition. The highest representative *emotion-as-content* intensity scores from each participant for the opening contexts, must be equal to or greater than seventy for the happy and anxious conditions. The lowest intensity rating of condition-appropriate emotions for the happy and anxious opening contexts, should be no lower than fifty. Contra emotion intensity ratings for the opening contexts must be equal to or less than 30 within the *happy* and *anxious* conditions, and contra emotional responses to the opening contexts should be represented by no more than twenty percent of obtained category labels.

Responses to the opening contexts in the 'neutral' conditions should contain no high intensity emotion labels (e.g., *euphoric*, *anxious*, *dread*, or *delighted*), that receive an intensity rating or more than 25, and not more than one high intensity feeling label per scenario. Intensity ratings of 50 or 80 for labels such as *relaxed*, *not much*, and *at ease*, accepted within this condition, as they indicated less intense emotions. A measure of the emotional nature of selection task materials was also obtained from participants who completed the first selection task study, and the reliability of the perceived emotional nature of materials was therefore assessed again at that stage.

5.5. Summary

This chapter presents an account of the final stage that was reached in the development of the new selection task before its use as a research vehicle. Space limits made the inclusion of an account of the development of *emotion-as-content* conditions within all nine scenarios (task versions) that were constructed at this stage impossible. To demonstrate the process of how *emotion-as-content* was realized in happy, anxious and neutral-lower-mixed emotion conditions, so that these selection task conditions would evoke happiness, anxiety or more muted, less intense emotional responses in selection task participants, a description of how this was achieved in one of the versions created for this new task (the driving scenario) has been presented. The assessment of these nine versions to see whether they might evoke the intended emotions in selection task participants, was then presented to demonstrate how the new selection task was assessed before it was used as a research vehicle to investigate how emotions, and all the other factors that were included within the decision contexts that would be presented within it, influenced card selection. The development of the task that is presented in this chapter represents a significant development in its design; the inclusion of the same conditional and card arrays across emotion as content conditions, would lead to greater confidence that any differences observed in card selections with this task between *emotion-as-content* conditions would be the result of emotion.

Chapter Six: The First Selection Task Study

The first study of how emotions might influence card selection frequencies within the new selection tasks, is reported within this chapter. An outline of the task is provided, and the hypotheses that were tested in this study are discussed. The study details are presented, and the data obtained in this study are then analyzed and discussed. This chapter thus provides a summary of the first selection task study that was conducted in this research programme.

6.1. Introduction

The present research programme began as a development of Manktelow and Over's (1991) suggestion that social role and utility provide the crucial key to understand perspective effects; that is, whether one inhabits the role of agent or actor in relation to a given deontic conditional, and the concerns that are relevant to one's goals from the perspective of one's role. Although social roles might provide an important key to understanding perspective effects within previous research studies with deontic versions of the selection task, when one opens the decision context or stimulus array so that it approximates, more closely, an everyday decision context, this factor provides a too limited framework within which to understand perspective effects, and limited power as an explanatory or predictive model. Several other factors seem likely to exert important influences on information processing and choice; for example, one's relationship with the other party with whom one has made or holds a social contract, key goals that are being pursued at the time, the utility of the contract to oneself (how important it is to establish or maintain or adhere to a conditional rule), and the expected outcomes or consequences and importance of the behaviour of oneself and other within the context of a given scenario, and within the context of the task.

Several variables have been proposed to explain participant card selection in previous versions of the old selection tasks, other variables have been identified within the preceding chapters that seem to have been important hidden features of the old tasks. These variables have been used to guide the construction of the new

selection tasks. The materials that are being used in this first selection task study have the following characteristics. To enhance the ecological validity of the task nature and content, and to allow investigation of reasoning within realistic social contexts, the foci of thematic content within selection task materials were everyday pragmatic, deontic conditional agreements that were made between two friends, or two people who are dating, or in one instance, two people who have just met on a work-related week way. The opening contexts that provide the context in which these agreements are made, the conditional agreements and the subsequent behaviours that are represented in the card arrays, have been designed to mimic realistic social situations that might be familiar to participants who complete this selection task. The social decision contexts that participants will be placed in within this selection task, include leaving a friend's house at the end of an evening, group dinner arrangements on holiday with friends, meeting your partner at a train station after a train journey, having diner in a restaurant, sledging on holiday, and being driven as a car passenger by your partner.

The agreements made within scenarios are represented as conditional ground rules, that are also private social contracts (e.g., Cosmides, 1989); they are mutually agreed prudential contracts that are made to manage social arrangements between the two parties within the different social settings. The two parties are therefore co-actors and co-agents (e.g., Gigerenzer &Hug, 1992; Manktelow & Over, 1991) within the materials used in this first selection task. The agreements are intended to be binding arrangements, to which both parties have made a firm commitment. Meaningful, sensible rationales for these ground rules are provided in the opening contexts, and both elements of the agreement (antecedent and consequent) are meaningfully connected.

Opening contexts, conditional agreements and card array behaviours that follow the agreement, were written in a narrative style that represents the perspective of one of the two people who are party to the agreement. Within this narrative, an episode unfolds in time in a manner that has been designed to evoke low to

moderate happiness, or low to moderate anxiety, or a neutral[29] emotional state. The opening narrative culminates with the two parties coming to a practically beneficial agreement. This narrative is intended to simulate a more immediate, realistic sense of the social decision context in which the selection task takes place. To allow a test of perspective effects that are driven by emotion, participants are asked to adopt the perspective of the character's experience that is described in the narrative. When read from this perspective, the scenarios have been designed to act as a stimulus to the intended *emotion-as-content* condition (i.e., happy, anxious, or neutral).

All six ground-rules take the following form: *if one party does p, then the other party must do q*. The participants' behaviour is positioned in the antecedent (i.e., in *p*, and *not-p*), and the behaviour of their friend, partner or colleague is positioned in the consequent (i.e., in *q*, and *not-q*). The ground rule thus becomes '*If I do p, then you must do q*', with *p* and *q* represented in each scenario by an action that each party performs. The participants' behaviour (*p*) occurs first, in all ground rules, before their friend or partner is then required to do (*q*) in return as they agreed. From the participant perspective, in three of the scenarios, the behaviour described in *p* is represented as a precondition that must be first met by the participant (i.e., no preferences are presented to represent this as a cost or benefit), before they receive their desired benefit which is represented by *q* (what the other party does in return). In the remaining three scenarios, behaviour *p* (the participant's) is represented as a cost to the participant, that is paid in exchange for the desired benefit that is represented by behaviour *q*. In all versions of the task, rule adherence was positioned so that it would be appraised as being a benefit for both parties to the agreement (and rule-violation, as a cost). No change in circumstances was introduced after the agreements to change that distribution of benefits and costs (i.e., so that rule violation might then be preferred). Bilateral cheating opportunities have been included within the agreement, and in the behaviours that

[29] In light of the feeling label data obtained in the rating task reported in chapter five, the content in the neutral condition might evoke low intensity joy, anxiety, hope, and anger in participants. The conditional agreements and card array items in both happy and anxious conditions might evoke emotions such as joy, anxiety, anger, disappointment and or sadness. The factors will be considered in discussions of obtained data.

follow this agreement that are presented in the card array. Within this first selection task study, however, participants were asked to determine whether or not the other party broke the agreement, and so a unilateral cheating condition has been operationalized here.

Cued Relevance within Content and Instructions

It has been argued (e.g., by Sperber, Cara & Girotto, 1995) that participants merely select the cards that have been heavily cued, within the scenario or task instructions, as being 'relevant' when participating in the selection task (e.g., by suggesting that one of the characters portrayed in the scenario is not trustworthy, or by instructing participants to select *only* those cards that show evidence of cheating or rule breaking). This cheater detection paradigm, which has been used to explain high 'facilitation' within earlier selection task studies, was not included within the design of this first study, to allow room for the possible effects of emotion on selection task performance. To minimize the possibility that participant selection patterns might be no more than selections of cards that have been cued as being relevant to the task by the experimenter, explicit cues to expected behavioural outcomes following the agreements (i.e., to how any party might behave after the agreement depicted within each scenario) were omitted from the task content and from instructions, to avoid heavy pointing at any of the card array items.

All of the variables that have been identified as having potentially important influences on task performance, during the process of constructing these new selection tasks, might be operationalized as independent variables. However, a more modest endeavour was undertaken. The first study was designed to allow investigation of the nature of emotional influences within reasoning and decision-making processes. More specifically, to investigate whether we could see evidence of emotional influences on card selection within the new selection tasks, and, if such evidence was observed, to determine how emotions influenced information representation, processing and selection behaviours in this task. Emotion was operationalized as two independent variables. One, as a *within-person* variable that would be manipulated before participants completed the selection task, and two,

as a *within-task* variable, which would be manipulated by the three *emotion-as-content* conditions that would be presented to participants during this first study. Happiness, anxiety and anger were the emotions focused upon in this project. However, given the nature of the scenarios developed here in the attempt to realize realistic decision-making contexts, other emotions might influence participant behaviour. To allow consideration of this possibility, a wider measure of emotion types was obtained within this study.

6.1.1. Experimental Hypotheses

Oaksford and Chater's (2007) account of emotion included only a consideration of responses to threatening information, but they situated this account within the selection task. They argued that we avoid all threat-related information because this information carries negative utility, and our automatic response when we encounter a threat is withdrawal. In the selection task, they predicted that participants should select fewer *not-q* cards when threatening information is displayed on the visible face of that card. In threatening contexts we will place greater utility in cards that display non-threatening information. Oaksford and Chater (2007) based this claim upon a study in which the 'threatening' information was said to be isolated within the *not-q* card. In the current study, threatening information has been presented to participants within the opening context of the anxiogenic *emotion-as-content* condition, in addition to being displayed on the visible face of the *not-q* card. If Oaksford and Chater are correct about our response to threat, participants should avoid *all* threatening information within this condition. If they interpret other behaviours in the card array as being threatening, they may also avoid their selection. If rule violation by the other party is viewed as being a threat in all *emotion-as-content* conditions, then participants should select few *not-q* cards in all *emotion-as-content* conditions. If participants view rule violation by the other party as being a greater threat in the anxiogenic *emotion-as-content* condition because this condition has evoked anxiety, then participants should select the fewest *not-q* cards in the anxiogenic content condition. However, Oaksford and Chater (2008) predicted the same emotional response to threat regardless of background emotional state; *emotion-as-within-person* groups should

thus have no effect on card selection patterns within this task based on their account.

According to Cosmides (e.g., Cosmides, 1989; Cosmides & Tooby, 2000; 2005) participants should select a high number of cards that might show evidence of rule violation by the other party in all versions of these tasks (i.e., select a high number of *p* and *not-q* cards), because all versions of the task present participants with a social contract context in which they might be cheated. Furthermore, there should be no differences in card selection patterns caused by *emotion-as-within* person or *emotion-as-task content* based on their account. Although these authors have provided an account of how anxiety can influence behaviour, they have not related this to behaviour in the selection task. According to their account of behaviour in the selection task, evolution has prepared us to be exceptionally good at detecting evidence of cheating within public or private social contracts regardless of our emotional state.

Based upon the investigations of how happiness, anxiety and anger can influence information processing, which were discussed in the opening chapter (e.g., Isen, 2000; Pool et al., 2016; Pourtois et al., 2013; Sander et al., 2005; Stewart et al, 2000; Strauss & Allen, 2006), differences in card selection patterns between *emotion-within-person* and *emotion-as-content* groups were predicted within this study. It was predicted that participants who were in an anxious or angry background emotional state when they encountered anxiogenic content, would be more likely to select card array items that might show evidence of rule breaking by the other party (*p* and *not-q*). This effect was predicted to be more general or wide reaching in anxious than angry participants. Anxious participants would be more likely to look for evidence of rule breaking by the other party in response to happy, anxiogenic *and* lower-mixed-neutral content (more likely to select *p* and *not-q* cards), although they would be most likely to do so in response to anxiogenic content (the highest frequency of *not-q* selection by them was predicted in the anxiogenic condition). They were predicted to do so because of the attentional biases that have been associated with anxiety; the broad and rapid scanning of the whole decision context for threats, enhanced detection and processing of threat, and a difficulty disengaging from threatening stimuli. This effect was also

predicted because of the interpretive bias that has been associated with anxiety; anxious people seem to be more likely to interpret ambiguous information as being threatening. The social contexts that are presented to participants in this selection task are complex (e.g., Funder, 1987; Gigerenzer, 1996). A partial account of events and behaviour is presented within the task, and in this sense the context might be ambiguous.

Angry participants, it was predicted, would be more likely to select evidence of possible rule violation by the other in response to anxiogenic content, but not happy or lower-mixed *emotion-as-content* conditions, because of the more focused attentional bias for threatening stimuli that has been associated with this emotion (Eckhardt, & Cohen, 1997; Maoz, Adler Bliese, Sipos, Quartana & Bar-Haim, 2016; Smith & Waterman, 2003; 2004). Angry participants might be more likely to expect the other person to cheat or break their agreement within the anxiogenic content condition, because of the negative interpretative and expectation biases that have been associated with anger (e.g., Bushman, & Anderson, 2002; Hazebroek, Howells & Day, 2001, Maoz et al., 2016; Wenzel & Lystad, 2005); they have been shown to interpret ambiguous accounts of behaviour as being evidence of the ill intent or hostility of other parties. Rule breaking behaviour (i.e., the *not-q* card, and perhaps the *q* card if participants understand the card array) might then be more salient within that condition. This was the finding reported by Chang & Wilson (2005), which was discussed in the opening chapter to this thesis. Angry participants in their selection task study were more likely than happy participants to select *p* and *not-q* cards in a cheater detection, social contract selection task. They were not more or less likely to select evidence of rule breaking by another party, however, than happy participants in a happier selection task.

Happy *within-person* participants were expected to select fewer cards that might reveal rule violation by the other party (*p* and *not-q*), and a higher number of cards that might show evidence of rule adherence by the other (*p* and *q*, or *q* cards). This effect was expected to be most pronounced in response to the happy *emotion-as-content* condition, because this condition was designed to evoke happiness. In the anxiogenic *emotion-as-content* condition, which was designed to evoke anxiety, participants in the happy *within-person* group were expected to select more cards

that might show evidence of rule violation by the other party (*p* and *not-q*), but to do so less frequently than anxious *within-person* participants would do across *emotion-as-content* conditions. This effect was predicted because of the happier background emotional state in which these participants would meet the stimuli. Happiness has been shown to be associated with an attentional bias for, and difficulty disengaging from, positive stimuli that are relevant to our concerns (e.g., Pool et al., 2016; Strauss & Allen, 2006; Vuilleumier, 2005); positive stimuli seem to be more salient in a happy emotional state if they associated with current tasks or goals. Happiness has also been associated with positive interpretative and expectation biases (e.g., Isen, 2000); when happy, we seem to be more likely to view current and past events in a positive light. Negative information has also been shown to be processed more shallowly when we are happy (e.g., Isen, 2000). Happiness is also associated with the building and maintenance of social bonds, and in this state we are thought to seek or attempt to maintain contact with safety or reward (e.g., Fredrickson, 1988; Frijda, 1986; Izard, 1977). Happy participants might therefore be expected to look for less evidence of rule breaking – because it is less salient, because they are less likely to expect others to behave in this way, and because they are more motivated to nurture, build and protect social bonds.

These differences might result from expectation biases that are activated within the background emotional state in which participants meet the emotional stimuli within the selection task, or from the greater salience of emotion-congruent information within the task. They might also arise from interpretative biases in response to task content. The 'neutral' (lower-mixed or neutral content) *within-person* and *within-content* conditions were included to provide a baseline against which emotional processing might be measured, as a background state and as a stimulus to response within the tasks.

6.2. Method

6.2.1. Participants

One hundred and twenty-five adults from the University of Leeds participated in the first selection task study. Participants included post-graduate students (male *N*

= 57, age *M* = 22.82, *SD* = 2.69; female *N* = 58, age *M* = 22, *SD* = 1.26), and academic staff (male *N* = 5, age *M* = 33.20, *SD* = 4.66; female *N* = 5, age *M* = 27.8, *SD* = 2.77) from the Schools of Engineering, Law, Medicine[30] and Business. Participants were recruited via email and poster advertisements across campus. Each received £10 for their participation.

6.2.2. Measurement and Design

6.2.2.1. Emotion-as-Within-Person Background State

Emotion as within person, task peripheral background state (*happiness, anxiety, anger, or neutral*) was manipulated between-subjects using an autobiographical recall task, which was completed immediately prior to participants starting the new selection tasks. The emotional state in which participants approached the selection task, was manipulated to provide greater control over emotional processing and associated behaviour within that task, and provide a better measure of how emotion might be influencing participant behaviour in the new selection tasks. This control should allow measurement of interactive influences of background emotional state and emotions evoked in response to the *emotion-as-content* presented to participants within the new selection tasks. If emotions influence what mental representations are active, so that emotion congruent content is more accessible, for example, and influence information processing strategies, such as orienting attentional resources towards emotion congruent information or stimuli that are relevant to our current concerns, and are associated with different expectations or goals, then the emotional state in which participants come into contact with the *emotion-as-content* conditions within the new selection tasks, might influence how they construe and respond to them. Participants who began the task in a happy, angry, anxious, sad or neutral emotional state, might react differently to the emotional inductions that are contained within the task content. If the emotional state of participants in which they began the task was not

[30] Students from the School of psychology were not recruited for this study, in case they had prior knowledge or experience of the selection task that might then interfere with task performance; the selection task was included in a year two module within this School. Students from the School of Philosophy were excluded for the same reason.

manipulated, or measured, the effects of emotion on card selection in the new selection tasks might be masked.

Autobiographical Recall Task: Emotion Induction Pre Selection Task

Instructions for the pre-task emotion induction were adapted from two sources (Chang & Wilson, 2004; Neumann & Philippot, 2007; see Philippot, 1993, for use of this emotion assessment method). Instructions used for the anger induction have been included here to give a sense of what the procedure involved (see Appendix 5. for the instructions used for each of the emotion induction conditions). The emotion induction required active effort by participants to recall, relive and describe an episode in which they felt the emotions that were intended to be evoked during this task.

> In this exercise you will be given ten minutes to write about a recent experience that made you feel *particularly irritated or angry. Your experience might, for example, have involved an event that was particularly unfair or avoidable; it might have involved actions of yourself and/ or others which made you feel incredibly annoyed or exasperated. Try to recall how you felt at the time of this experience and to relive these moments as vividly as possible whilst you are writing about/ describing these in the space below.*
>
> Focus your description on the feelings, thoughts, images, physical sensations and reactions felt during this experience and which you might have experienced on other occasions when you've felt particularly *annoyed or angry.*
>
> *Please remember that the answers provided by you within this session will not be used or stored in any way that would link your identity to them.*

6.2.2.2. Measurement of Emotion Pre Selection Task

Two measures of self-reported emotional state were obtained pre and post completion of the autobiographical recall task. One, was a modified, shortened version of the Differential Emotions Scale (DES, Izard, Dougherty, Bloxom & Kotsch, 1974, modified by McHugo, Smith & Lanzetta, 1982); the second was obtained using participant generated free-response emotional feeling-labels (see Appendices 6 and 7 for instructions and measures). Six of the eight emotion categories from McHugo et al.'s (1982) revised DES measure were included in the measure devised for this study; they were *anxiety, fear, anger, sadness, joy and amused* (*disgust* and

scorn were not included). Each of these six emotion types were measured using the following adjectives, which were presented to participants within a rating scale: *anxious, tense, nervous; fearful scared, dread, angry, irritated, annoyed, sad, low, miserable, joyful, happy, amused*. *Happy, low, annoyed, miserable* and *dread* were amended referents for *merry, blue, mad, downhearted*, and *afraid*, which were used in the McHugo et al. (1982) measure. The revised terms were felt to be more familiar for participants (*dread* was used in place of *afraid*, as that was felt to be very close in meaning to *scared*, which was included within the scale; *dread* seemed to provide a more differentiated feeling state). *Affectionate* and *friendly*, which have been classified as providing measures of *love* (e.g., Ortony, Clore & Collins, 1988) were also included in the modified scale (see Appendix 5 for instructions and measure); these terms were not included in McHugo et al.'s measure, but they were included here to capture feelings that had been reported by participants in the rating tasks. These emotions might also provide useful indicators of how participants respond in the new selection tasks.

The shortened version of the DES was selected to minimize the total participation time required of participants, to reduce the possibility of the task itself becoming a focus for participants as a result of duration, and avoid responses that were due to factors such as participants becoming tired of the task. Data from the DES were supplemented with self-generated feeling labels that participants used to described any other emotions felt. This combination of measures was designed to include emotions that are excluded from measurement and consideration in any limited emotion category scale. Instructions for the self-generated emotions, which are presented below, were adapted from the PANAS (Watson et al., 1988). These were an amended version of the instructions that had been used in the rating tasks reported earlier within this thesis, to ensure that participants understood that they were being asked to describe emotions rather than any other feelings (i.e., to avoid the inclusion of the many non-emotional feelings that were reported in the rating task).

Emotion Feeling Labels: Free Response Task Instructions

Indicate how you feel right now, at this moment, by describing in the spaces provided below, the three key or most intense emotions that you're feeling. Use one or two words

to describe each emotion, and select the appropriate position on the scale placed below each emotion to indicate the strength of this feeling.

If you are feeling NO emotions at this moment, please indicate this in the space provided. If you cannot think of three feelings, give details of those feelings that come to mind and then move on to the next section. Do not spend too long thinking about your feelings; a quick response is required.

Remember that the answers provided by you within this session will not be used or stored in any way that would link your identity to them.

Measures of emotional state pre and post emotion induction allowed assessment of the effectiveness of the autobiographical recall task. They also provided a measure of participants' emotional state at the start of selection task, to determine whether participants had begun the selection task in their assigned *emotion-as-within-person* conditions. An additional control group was included within the *emotion-as-within-person* variable, to allow examination of participant responses within the selection task without prior manipulation of peripheral emotional state. Participants in this control condition, completed the two measures of current feeling state prior to completion of the selection task, and did not take part in the autobiographical recall task.

6.2.2.3. Emotional Responses to Selection Task Materials.

To realize emotion as a within-task-content variable, six separate scenarios had been constructed for use in the selection task. Each scenario included an opening context, conditional agreement and a four-card array of possible outcome behaviours that followed the agreement. Each of these scenarios was constructed in three different *emotion-as-content* conditions (*happy*, *anxious* and *neutral*) to provide a more robust test of emotion as a within-task variable. When reading the scenarios presented to them in the selection task, participants were asked to

'*Imagine that YOUR experience is being described within each of the situations, and that you are experiencing the situations as they are described'… if you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship*'.

The remainder of the selection task instructions were written from this same perspective. The card array thus contained examples of what the participant might

have done following the agreement on one side of the card, and the associated behaviour of their friend or partner on the other side of the card (see Appendix 8 for full selection task instructions). When read from the directed perspective, the scenarios were designed to evoke the emotions that were targeted within that *emotion-as-content* condition (i.e., happiness, anxiety or neutral). Different versions of the six scenarios had been constructed for male and female partners, in situations that involved partners who were dating, so that participants could be matched with their preferred partner. Sadly, it was not possible to ask participants about their sexual preferences within this study, and so the sex of the partner assigned to some participants may have not matched their preference. Participants were given scenarios that assumed a heterosexual relationship with dating partners[31].

A measure of emotional responses to the scenarios (opening contexts, conditional agreements and card array behaviours) that participants were presented with during completion of the selection task, was obtained *after* participants had completed the selection tasks. This was obtained after completion of the selection task, to avoid interfering with card selection. The post hoc measure was used to gauge whether the task content might have evoked the intended emotional responses, in participants in all *emotion-as-within-person* induction groups. It was also used to assess whether there were differences between *emotion-as-within-person* induction groups in their emotional responses to selection task content. To obtain a measure of emotions evoked by task content, participants reported how they felt whilst reading through the opening contexts, agreements, and each of the card array behaviours. Emotions were reported using the free generation of emotional feeling labels and intensity ratings method that had been used at the start of the study procedure. Intensity ratings were recorded on 100mm analogue scales as before (for the measure of emotion and instructions used in this final task, see Appendix 9).

[31] Two participants indicated within the rating task at the end of the study that the gender of their partner was incorrect, and that they felt angry during the task because it seemed that I had assumed people would prefer a heterosexual partnership. There may have been more participants in the study who felt similarly but did not report it. If it is not possible to ask participants for their sexual preferences, gendered terms could be replaced with *they* and *their*.

6.2.2.4. Additional Measurement Dimensions

To provide a more thorough assessment of how participants viewed the situations, agreements and behaviours that were described within the materials presented to them in the selection task, participants also provided ratings of familiarity, realism, plausibility (e.g., Ball et al., 2006; Gagné & Spalding, 2006; Markovits & Schroyens, 2007; Ortony et al., 1988; Ward & Overton, 1990), the nature of risks or feared events that came to mind when reading the task materials, and the subjective importance of situation outcomes (e.g., Evans, 2008a; Frijda, 1986; Hockey, Maule, Clough & Bdzola, 2000; Ortony et al., 1988) for the scenarios that were presented to them in the selection task. These ratings were obtained after the selection task, alongside the participant reports of emotions felt in response to the task content. Participants were asked to imagine themselves within the situations described in the scenarios, and that they were experiencing them as they were described when providing ratings for these dimensions. Measures of these additional dimensions were obtained as numerical responses to the following questions (see Appendix 10 for the instructions and question and answer format used in this rating task).

1.a. How realistic is the situation described within this scenario? (0 = *not at all*, 2 = *a little*, 5 = *moderately*, 8 = *highly*, 10 = *very highly*): ……

1.b. How easy would it be for you to imagine *yourself* in this situation, or in a situation that is very similar to the one described within this scenario? (0 = *impossible*, 2 = *difficult*, 5 = *moderately easy*, 8 = *easy*, 10 = *very easy*): ……

2.a. How frequently have *you* and /or close friends and/ or family experienced the situation or a situation that is very similar to the one described within this scenario? (0 = *never*, 2 = *infrequently*, 5 = *moderately*, 8 = *often*, 10 = *very frequently*): …….

2.b. How frequently do you think *others in general* experience the situation or a situation that is very similar to the one described within this scenario? (0 = never, 2 = infrequently, 5 = moderately, 8 = often, 10 = very frequently): ……

1. Describe the nature and severity of risk associated with or present within this scenario for YOU[32]……Severity (*0 = insignificant, 2 = mild, 5 = moderate, 8 = severe, 10 = very severe*): ……

[32] An additional explanation of what was being asked here was provided for participants in their instructions, in an effort to ensure understanding of what information was sought. Space was provided to report four different risks that were present within the content for each section of the task (opening context, conditional agreement and each card array item).

4.a. How important would it be for you to gain a favourable outcome within this scenario? (*0 = not at all, 2 = a little, 5 = moderately, 8 = very important, 10 = essential*): ……

4.b. How important would it be for you to avoid a negative outcome within this scenario? (*0 = not at all, 2 = a little, 5 = moderately, 8 = very important, 10 = essential*): ……

4.c. How important would the outcome of this episode be for you (*i.e., does it matter what the outcome is*)? (*0 = not at all, 2 = a little, 5 = moderately, 8 = very important, 10 = essential*): ……..

Although the use of scale anchors can affect responses (e.g., Carlsson, 1983; Kline, 2015; Saal, Downey, & Lahey, 1980), their use within this study should provide a gauge of how the materials were perceived by participants. If the scales were to be used in future investigations, or for comparison of data that had been obtained from other sources, the use of scale anchors might be reconsidered.

6.2.2.5. Selection Task Instructions

To avoid too heavy cuing of expectation in this study, participants were not given any explicit direction that they should feel uncertain about whether the other party would keep to their agreement, neither were they given any explicit reasons to suspect that the other party might break their agreement (as they would be if the cheater detection design were used) (e.g., Manktelow & Over, 1991). The rule violation instructions used by Griggs and Cox (1983) were adapted for use here; the original instructions were to '*select those cards that you definitely need to turn over to determine whether or not the people are violating the rule*'. In the present study participants were asked '*which card(s) would you definitely need to turn over to see whether or not she breaks your ground rule*'. This was supplemented with an additional explanation within the description of their task and what was displayed on the cards; participants were informed '*your task is to decide, for each scenario, which of the cards would need to be turned over (which bits of information you would need to check) to find out whether or not your girlfriend/friend breaks the ground rule that you agreed to*'. *She* and *girl* were replaced by *he* and *boy* in some versions, to match the content within the scenario and ground rule.

These instructions placed a softer emphasis upon selecting behaviour that showed evidence of rule breaking, than was present in versions that instructed participants to select cards that would show '*whether a given character had broken the rule*' (as in, e.g., Manktelow & Over, 1991). The inclusion of '*or not*' was used to allow room for emotion to influence inference, and the salience of different kinds of information. Participants were also informed within the instructions that there were no right or wrong answers within this study. Mild rule violation instructions were therefore used for these first selection tasks. Task instructions were tested before use in the selection task (*N* = 16), to ensure that they might be easily understood by participants (see Appendix 8 for selection task instructions).

6.2.2.6. Design

A *3 emotion-as-task-content* (happy, anxiogenic, neutral) by *5 emotion-as-within-person* (anger, anxiety, joyfulness, neutral and control) design was utilised for this study. *Emotion-as-task-content* was operationalized as a *within-subjects* variable. *Emotion-as-within-person* was operationalized *between-subjects*. Participants were presented with one *emotion-as-content* version of each of the six selection task scenarios that were used in this study; two scenarios were presented in each of the *emotion-as-content* conditions (i.e., participants received 2 *happy*, 2 *anxiogenic* and 2 *neutral* versions). Card array item selection served as the dependent variable. Intended *emotion-as-content* conditions for each of the situation-contexts were counterbalanced across participants, to allow for a more robust test of the effects of intended *emotion-as-content*. Scenario presentation order was also counterbalanced across participants, as was the card array presentation order within each of the scenarios; six card-array orders were used in to achieve the latter. Participants were randomly allocated to emotion induction conditions using a random-numbers table.

6.2.3. Ethics

Ethical clearance for conduct of this study was obtained via the self-certification scheme from the Institute of Psychological Sciences Ethics Committee at the University of Leeds (Reference No. 08322-01, and 08163–03). The design and

conduct of this study adhered to the British Psychological Society's (BPS, 2014) code of Human research ethics.

6.2.4. Procedure

This study was conducted within the School of Psychology at the University of Leeds. Participants were recruited via email to the Schools of Medicine and Business, and via poster advertisements that were positioned across campus at the University of Leeds (see Appendix 11 for the participant information sheet that was provided during recruitment). Following completion of participation consent forms[33], participants were allocated to emotion induction groups (happiness *N* = 25; anxiety *N* = 26; anger *N* = 26; neutral *N* = 24, and control *N* = *24*). All but one participant completed the task in groups of *c*. 10 [34]. All task materials were presented and completed in paper and pen format. Task booklets that were designed for each of the emotion induction conditions were given to participants at the start of the study. These booklets contained the emotion measures used before the autobiographical recall task, the autobiographical recall task, the measures of emotion after this task, six versions of the selection task, and the final rating task of selection task materials. Participants were asked to work their way through these booklets, in order of the page numbers, and to read any instructions carefully before completing each section. They were informed that they could ask for help if they were unsure at any point what the instructions were asking them to do.

Within the task booklets, participants completed the adjusted version of the DES and free response feeling labels measure of current emotional state. They then completed the autobiographical recall task[35], before completing a second measure of current emotional state using self-generated emotion labels and the adjusted

[33] See Appendix 12 for a copy of the consent form that was used in this study.

[34] One participant used an assistant/ reader to help them read the materials and complete their responses to the tasks, and so they completed the task in a separate room. This participant was allocated to the *Control* emotion induction group and so was not included within the random-numbers Table, to avoid this participant having to reveal personal details to their assistant/ reader. It was felt that the presence of the reader would interfere with the autobiographical recall induction in these circumstances.

[35] The time that participants spent completing the autobiographical recall task was measured, discretely, to ensure that they spent the allocated time on this task.

DES. Participants in the *control emotion-as-within person* group, were not exposed to the opening emotion induction; they completed the adjusted version of the DES and free response feeling labels measure of current emotional state on one occasion, before starting the selection task.

All participants then completed six versions of the four-card selection task, within which emotional content was embedded (2 x *joyful*, 2 x *anxiogenic*, 2 x *low intensity happy-anxiogenic-neutral*). Participants indicated which cards they selected in each version of the selection task, by placing a cross in the answer box for each chosen card; answer boxes were positioned below each of the cards. After finishing the selection task, participants read through each of the six scenarios that they had been presented with within the selection task (the orders in which these were presented were again counterbalanced, as were the card array items), and completed measures of how they felt whilst reading through them, in addition to providing judgements of realism, familiarity, frequency, risks, and outcome importance. All participants then completed a positive autobiographical recall task, which was intended to function as a positive emotion induction, in case any part of their participation in this study had evoked thoughts or feelings that would negatively affect them. The joy induction task that was used at the start of this study within the *happy emotion-as-within-person* induction group was used for this final induction. Participants were debriefed at the end of the study. Total participation time varied between participants from approximately sixty to ninety minutes.

6.3. Results

6.3.1. Emotion Induction Groups.

Before consideration of the card selection data, the validity of assigned *emotion-as-within-person* groups was assessed using a MANOVA on DES cluster difference scores, with group (*happy, anxious, angry, neutral* and *no emotion induction*) as a *between-subjects* variable and difference scores for each DES cluster (*affection, joy, anger, anxiety, fear* and *sadness*) entered as separate within-subjects variables. Difference scores of zero were entered for the control group within this analysis; as

scores between happy, anxious, angry and neutral induction groups manifested zero crossings on each cluster, this strategy was thought to be acceptable. DES cluster scores were represented by mean scores of the variables within each cluster (e.g., joy cluster: happy + joyful + amused/ 3). DES cluster difference scores were the result of post-induction DES cluster score - pre-induction DES cluster score; positive difference scores were thus indicative of an increase in emotion post-induction, and negative difference scores of a decrease in emotion post-induction. Post hoc analyses with pairwise comparisons and Bonferroni corrections on separate DES clusters, was calculated between-groups.

Significant overall effects of *group* were observed for *affection* [$F_{(4,120)} = 5.97$, $p < .001$], *joy* [$F_{(4,120)} = 7.57$, $p < .001$], anger [$F_{(4,120)} = 7.03$, $p < .001$], *anxiety* [$F_{(4,120)} = 12.56$, $p < .001$], and *fear* [$F_{(4,120)} = 3.13$, $p = 0.17$] clusters. No significant differences were observed between *groups* on difference scores for the *sadness* ($F < 1$) cluster. Post hoc comparisons of DES difference scores between *emotion-within-person* groups, revealed significant direction appropriate differences *between groups* for affection, joy, anxiety and fear in post hoc comparisons; these are reported below in Table 19 (Bonferroni values are reported).

In *all* groups, emotion scores moved in the appropriate direction post-induction: in the *Happy* task peripheral emotion induction condition, participant DES emotion ratings indicated an increase in joy and decreases in anxiety, fear, anger and sadness post-induction (*vs*. pre-induction DES scores). In the *Anxious* emotion induction condition participant DES emotion ratings indicated decreases in joy, anger and sadness, and increases in anxiety and fear post-induction. In the *Anger* induction group, scores for joy, anxiety, fear and sadness decreased post induction, whilst anger scores increased. In the *Neutral* emotion induction condition, participant DES ratings indicated decreases in joy, anxiety, fear, anger and sadness post-induction (*vs*. pre-induction DES scores).

Table 19. Significant differences in DES cluster difference scores by DES cluster and autobiographical recall emotion induction group.

DES Cluster	Autobiographical Recall Group	*M Diff*	*SE*	*p* value
Affection	Happy *vs*. Anxious	18.12	4.44	$p < .001$
	Happy *vs*. Angry	15.45	4.44	$p = .007$
	Controls *vs*. Anxious	14.38	4.49	$p = .017$
Joy	Happy *vs*. Anxious	21.37	4.29	$p < .001$
	Happy *vs*. Angry	18.88	4.28	$p < .001$
Anger	Anger *vs*. Happy	22.53	4.78	$p < .001$
	Anger *vs*. Anxious	17.26	4.73	$p = .004$
	Anger *vs.* Neutral	19.07	4.83	$p = .001$
	Anger *vs*. Control	19.17	4.83	$p = .001$
Anxiety	Anxious *vs*. Happy	25.12	4.41	$p < .001$
	Neutral *vs*. Happy	15.28	4.50	$p = .009$
	Anger *vs*. Happy	28.46	4.41	$p < .001$
	Anger *vs*. Neutral	13.19	4.45	$p = .037$
	Control *vs*. Happy	18.44	4.50	$p < .001$
Fear	Anxious *vs*. Happy	12.44	3.65	$p = .009$

Key: The group with the highest difference score is reported first in this Table (happy participants thus were happier after the autobiographical recall task than they had been before it, and the increase in their happiness was significantly higher than it was for participants in the anxious and angry autobiographical recall groups, for example).

To assist assessment of the emotional state of the *emotion-as-within-person* groups at the start of the selection task, a descriptive summary of DES cluster scores post autobiographical recall induction by induction group is presented in Table 20. As can be seen from the data in Table 20, although mean scores in the emotion induction groups were representative of the intended emotion within the groups, variation around mean scores was high in all induction groups.

A MANOVA on post induction DES cluster scores, with group (*happy, anxious, angry, neutral* and *no emotion induction*) as a *between-subjects* variable and post induction scores for each DES cluster (*affection, joy, anger, anxiety, fear* and *sadness*) entered

Table 20. Descriptive statistics for post-induction DES cluster scores by DES cluster and autobiographical recall emotion induction group.

		Emotion Induction Group				
DES Cluster		Joy	Anxiety	Anger	Neutral	Control
Affection	*M*	52.40	38.63	40.00	46.48	50.77
	SD	23.25	25.89	22.00	20.39	19.92
	SE	4.65	5.08	4.32	4.45	4.25
	Min-Max	0 - 93	0 - 87.50	0 - 79.50	0 - 72.50	4.50 - 83.50
Joy	*M*	50.68	28.53	35.99	46.75	42.39
	SD	21.43	21.58	17.33	19.21	18.54
	SE	4.29	4.23	3.40	4.19	3.95
	Min-Max	1.33 - 99.00	0 - 65.67	1 - 61.33	0 - 76.00	4.00 - 81.67
Fear	*M*	10.59	19.79	13.35	13.13	15.82
	SD	16.12	21.15	13.99	20.95	17.97
	SE	3.22	4.15	2.74	4.57	3.83
	Min-Max	0 - 70.00	0 - 80.67	0 - 44.33	0 - 66.67	0 - 53.00
Anxiety	*M*	19.76	35.24	28.18	24.84	28.58
	SD	21.35	22.66	21.43	26.75	23.02
	SE	4.27	4.44	4.20	5.84	4.91
	Min-Max	0 - 80.67	0 - 78.00	0 - 73.00	0 - 100.00	0 - 75.00
Anger	*M*	8.23	19.28	43.15	15.51	13.58
	SD	14.55	21.27	26.80	21.66	17.24
	SE	2.91	4.17	5.26	4.73	3.68
	Min-Max	0 - 57.67	0 - 78.00	4 - 81.33	0 - 83.00	0 - 60.00
Sadness	*M*	13.05	27.68	26.26	17.86	14.12
	SD	16.62	26.62	19.96	20.26	16.98
	SE	3.32	5.22	3.91	4.42	3.62
	Min-Max	0 - 61.67	0 - 84.00	3 - 70.67	0 - 66.67	0 - 63.33
		N = 25	*N = 26*	*N = 26*	*N = 24*	*N = 24*

Key: Affection (friendly & affectionate), Joy (happy, joyful, amused), Anger (angry, irritated, annoyed), Anxiety (anxious, tense, nervous), Fear (fear, scared, dread), Sadness (sad, low, miserable).

Table 21. Significant differences in post-induction DES cluster scores by DES cluster and autobiographical recall groups.

DES Cluster	Autobiographical Recall Group	*M Diff*	*SE*	*p* value
Joy	Happy *vs*. Anxious	22.15	5.48	$p < .001$
	Happy *vs*. Angry	15.06	5.48	$p = .069$*
	Neutral *vs*. Anxious	19.31	5.54	$p = .007$
Anger	Anger *vs*. Happy	34.34	5.94	$p < .001$
	Anger *vs*. Anxious	23.28	5.88	$p = .001$
	Anger *vs*. Neutral	25.47	6.00	$p < .001$
	Anger *vs*. Control	28.89	6.00	$p = .001$
Anxiety	Anxious *vs*. Happy	17.37	6.39	$p = .020$
	Anger *vs*. Happy	19.17	6.39	$p = .003$

Key: * Not significant

as separate within-subjects variables, was used to assess differences between *emotion-within-person* groups in post induction DES cluster scores (significant differences between groups are reported in Table 21). Happy *within-person* participants were significantly happier and more affectionate than anxious or angry *within-person* participants. Angry *within-person* participants were significantly angrier than all other *within-person* emotion induction groups.

However, Anxious *within-person* participants were significantly more anxious (and fearful) than only the Happy *within-person* participants. Angry participants were also significantly more anxious than Happy participants, and more anxious than Neutral participants. Control and Neutral participants were both significantly more anxious than Happy participants, and so the induction seems to have been moderately successful.

Anger, like anxiety is a response to a perceived threat. It might be that the emotion induction task is a little messy, in that it can evoke more emotions than are targeted within the task. Asking participants to recall an event that made them feel angry, as well as activating anger, might also evoke anxiety if that event is associated with uncertain outcomes that are still feared. In other participants, in which the

perceived threat has passed, and other events have followed, participants might then feel happy or relieved, or sad (or other emotional responses to the events). The induction of other emotions using this method of autobiographical recall might be equally messy. A significant number of participants in the anxiety and anger induction groups reported within their rating booklets, and after the task, that describing an event that had made them feel anxious or angry had made them feel better about this event. This therapeutic effect perhaps reduced differences in anxiety and anger for those participants, which might account for some of the variation in emotion scores within induction groups.

The emotion induction task seems to have shifted participant emotional states in condition appropriate directions. Emotion scores within and between groups in which emotions were induced were also appropriate for the *emotion-as-with-person* conditions. There were significant differences post induction, in measures of the emotions that were targeted during the emotion induction (i.e., joy, anxiety, and anger) between the groups in which those emotions were induced, although there were also high levels of variation in emotion within emotion induction groups. These factors should be considered when interpreting data obtained from the selection task.

6.3.2. Realism, Frequency, Risk and Outcome Importance

The data obtained on the nature of risks that were presented within selection tasks scenarios, has not been included for analysis. It became clear from participant reports during their debrief sessions, that many participants had interpreted the risk intensity judgement ('*describe the nature and severity of risk associated with or present within this scenario/ ground rule/ behaviour*') as a measure of subjective probability (i.e., how *likely* the described behaviours or events were believed to be, despite clear instructions to ignore this factor). Some participants used this measure to report the potential personal cost or consequences of risks or behaviours that were described within scenarios[36]; this data provides some insight into what participants were concerned about within the selection task. However,

data obtained from this measure were not used to assess what risks participants perceived within scenarios.

There were no significant differences in participant ratings for any of the six different scenarios on any of the dimensions reported here. The six scenarios have therefore been treated as a group in the analysis that follows. Descriptive statistics for realism, frequency and outcome importance (each measured on 11-point scales, with zero signifying an absence, and 10 a very high level of the referent) are presented in Table 22. The degree of 'general' realism (*how realistic is the situation described*) achieved by scenarios was moderately successful; most participants viewed the scenarios as being moderately (*5*) to highly (*8*) realistic. The ease of imagining oneself within the situations described, largely mirrored general realism scores, although scores were a little lower here.

The situations developed for this study achieved only low to moderate ratings (*2* = *infrequently*, *5* = *moderately*, *8* = *often*) for frequency for self (*how frequently have you, family or close friends been in a situation like the one described*), but moderate to high frequency for other scores (*how frequently do you think others in general experience a situation that is very similar to the one described*). All participants thought that the described events would be experienced more frequently by others. Whether these frequency ratings referred to the specific unfolding of events within the scenarios, or to the general situations portrayed, cannot be inferred from the feeling labels or numerical data. However, feedback from participants during the debrief suggested that many were referring to the specific unfolding of behaviours and events as they were described within the scenarios, rather than to the wider social setting or agreements within them, when providing ratings for the frequency-for-self (and others) item.

[36] For example, in the sledging scenario, participants reported what might happen if they fell off their sledge, in the driving scenario they reported what might happen if the other person did not let them drive, and in the other scenarios they reported what might happen if either kept or broke the agreement.

Table 22. Descriptive statistics for realism, frequency and outcome importance by emotion induction group and *emotion-as-content* condition.

Emotion within-Person	Emotion as Content	Realism-G		Realism-S		Frequency-S		Frequency-O		Positive-OI		Negative-OI		Overall-OI	
		M	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*	*M*	*SE*
Joy (*N* = 25)	Joy	7.26	0.34	6.76	0.34	4.66	0.32	7.24	0.28	6.24	0.47	6.86	0.41	5.86	0.53
	Anxiety	7.56	0.28	6.18	0.45	4.52	0.36	6.88	0.26	7.76	0.39	8.36	0.31	7.64	0.36
	Low	7.20	0.36	6.48	0.44	4.82	0.31	7.32	0.22	6.52	0.36	6.96	0.34	6.08	0.36
Anger (*N* = 26)	Joy	6.94	0.33	6.96	0.36	4.96	0.28	7.89	0.28	6.23	0.34	7.14	0.32	5.89	0.42
	Anxiety	7.65	0.29	7.34	0.39	4.73	0.34	7.42	0.25	7.91	0.38	8.59	0.27	8.74	0.34
	Low	7.35	0.37	7.02	0.44	4.80	0.32	7.87	0.27	5.76	0.32	6.69	0.36	5.21	0.33
Anxiety (*N* = 26)	Joy	6.88	0.28	6.76	0.38	5.29	0.31	6.65	0.25	6.65	0.37	6.63	0.31	6.50	0.39
	Anxiety	6.67	0.24	5.83	0.44	4.46	0.31	6.21	0.23	7.75	0.28	8.21	0.30	7.90	0.33
	Low	7.06	0.29	7.02	0.34	5.27	0.33	6.71	0.23	6.73	0.35	6.55	0.32	6.55	0.33
Neutral (*N* = 24)	Joy	6.54	0.36	6.59	0.42	5.33	0.43	6.61	0.34	6.70	0.51	7.48	0.38	6.07	0.44
	Anxiety	6.05	0.42	5.57	0.43	4.69	0.35	6.05	0.32	7.89	0.37	8.31	0.29	7.69	0.35
	Low	6.97	0.38	6.30	0.44	4.97	0.35	6.83	0.32	6.55	0.31	7.37	0.33	5.80	0.31
Control (*N* = 24)	Joy	7.37	0.35	6.87	0.31	5.25	0.29	6.67	0.32	5.77	0.45	7.07	0.41	5.42	0.52
	Anxiety	7.67	0.32	6.22	0.43	3.87	0.43	5.75	0.30	7.87	0.46	8.27	0.33	7.72	0.42
	Low	7.45	0.41	7.17	0.47	4.65	0.42	6.57	0.32	6.05	0.43	6.27	0.43	5.82	0.36

Key: Realism-G: Realism General (*how realistic is the situation described*) 0 = *not at all* – 10 = *very highly*; Realism-S: Realism Self: ease of imagining oneself within the scenario, 0 = *impossible* – 10 = *very easy*; Frequency-S: frequency of this experience for self; Frequency-O: frequency of this experience for others; Frequency intensity: 0 = *never* – 10 = *very frequently*; Positive-OI: importance of achieving a positive outcome; Negative-OI: importance of avoiding a negative outcome; Overall-OI: importance of the situation outcome. Outcome importance intensity: 0 = *not at all* – 10 = *essential*.

Ratings of outcome importance for each scenario were obtained to explore how important participants thought the outcomes were in the situations described. Additionally, to assess whether participants would regard outcomes as being more important in the anxious and happy *emotion-as-content* conditions; utility would be expected to be higher for matters that aroused emotions, as by definition, emotions are thought to arise in response to things that are important. The importance of achieving a positive outcome, avoiding a negative outcome, and the overall outcome importance, were all highest in the anxiety evoking condition for these scenarios across emotion induction groups. To test for significant differences between conditions, *emotion-as-within-person* (between-subjects) and *emotion-as-content* (within-subjects) were entered as independent variables into a MANOVA; importance of achieving a positive outcome, importance of avoiding a negative outcome, and overall outcome importance were entered as dependent variables. There was no main effect of *emotion-as-within person* (all *F*s < 1), and so this factor was removed from the analysis. There were significant main effects of *emotion-as-content* on all three dependent variables (all *p*s < .001); importance of achieving a positive outcome (F (2, 228) = 21.94, $p < .001$), importance of avoiding a negative outcome (F (2, 228) = 34.67, $p < .001$), and overall outcome importance (F (2, 228) = 32.38, $p < .001$).

Avoiding a negative outcome was consistently rated as being more important than achieving a positive outcome across *emotion-as-content* conditions (although for participants who were in the anxious *within-person* induction, this was true only in response to anxious content; the importance of avoiding a negative outcome was seen as being less important when responding to positive and neutral-lower-mixed emotional stimuli within that induction group). Avoiding a negative outcome and achieving a positive outcome were consistently rated as being most important when participants were responding stimuli that evoked anxiety (i.e., this was more important in the anxious-content condition than in happy and lower-mixed *emotion-as-content* settings). Avoiding a negative outcome was also rated as being

more important than the overall importance of the outcome in most conditions. The importance ratings for scenarios are reasonably high, ranging generally from moderately important to important (*5* = *moderately important*, *8* = *very important*, *10* = *essential*).

From feeling label data, the negative outcomes feared in these scenarios seem to be the consequences of behaviour on the relationships that are involved or at stake in the agreements, with arguments, tension within or dissolution of the relationship referenced as being the major sources of participant concern. Relationships are also the major referent in descriptions of positive outcomes that were sought or hoped for in the situations portrayed in the selection task materials (i.e., maintaining or enjoying a good relationship, or developing a closer relationship with the other party portrayed in scenarios), although '*getting to do what I want*' also featured in many of the participant feeling label reports of what a *good* outcome would be within these participant ratings.

6.3.3. Card Selection Analysis

In line with previous research with the selection task, card selection patterns were assessed using confirmation and falsification Pollard indices (e.g., Pollard & Evans, 1987). There were no significant differences in Pollard indices between any of the six different scenarios used within this study, and so the following analysis has been conducted with card selection frequencies collapsed across scenarios.

6.3.3.1. Confirmation Indices

The Pollard confirmation index (CI) is calculated by assigning a score of one to each card that has been selected and a score of zero to each card not selected, for each of the selection tasks completed for each participant; for this analysis, each card is labelled as either p, $\neg p$, q, or $\neg q$. The following equation is then calculated for each task using these scores: $(p + q) – (\neg p + \neg q)$. The confirmation index ranges from –2 to +2, with higher scores representing more frequent selection of p and q. This formula has been used to assess confirmation of the rule in previous investigations

with the selection task, as it represents selection of the behaviours, outcomes or cards that were named in the rule. A mixed ANOVA was conducted on mean confirmation indices by participant, with *emotion-within-person* (*happy*, *anxiety*, *anger*, *neutral*, *control*) as a *between-subjects* factor and intended *emotion-as-content* (*happy*, *anxiogenic*, *lower-mixed*) a *within-subjects* factor. No main effects of *emotion-within-person* ($F < 1$, partial/ $\eta^2 = .005$) or intended-*emotion-as-content* ($F < 1$, partial/ $\eta^2 = .001$) were observed, but a significant interaction between *emotion-within-person* and *emotion-as-content* was observed [$F_{(6, 194)} = 3.09$, $p = .007$, partial/ $\eta^2 = .08$] (see Figure 27).

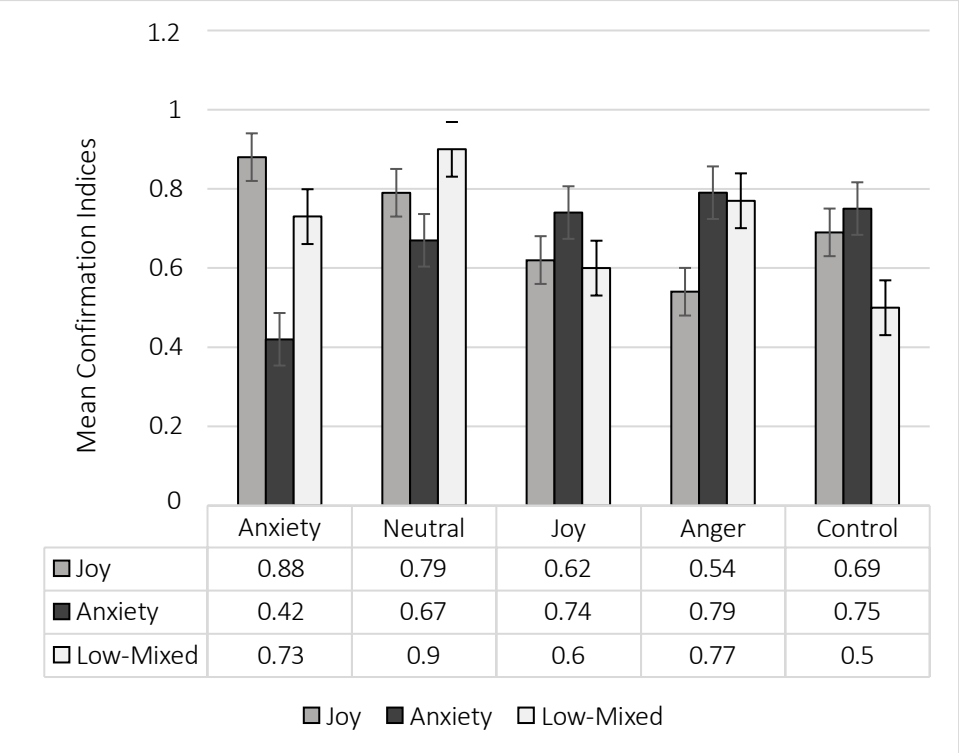


Figure 27. Interaction between *emotion-as-within* person and intended *emotion-as-content* condition on mean confirmation indices ($p = .007$, partial/ $\eta^2 = .08$).

Within the graphed data displayed in Figure 27, there appear to be no main effects of either emotion as background state or as task content. However, this analysis was repeated with the 'control' *emotion-within-person* condition removed, to assess what effect inclusion of this group had on analysis. There had been no

manipulation or control of peripheral emotional state before the selection task within this group of participants, and the effects of emotion on behaviour might therefore be more variable within this group than in other *emotion-within-person* conditions. Removal of this control condition from analysis to explore what effects its absence had on analysis thus seemed acceptable. A repeated measures ANOVA was conducted on mean confirmation indices, with *emotion-within-person* (positive, anxiety, anger, neutral) as a *between-subjects* factor and intended *emotion-as- content* (joy, anxiogenic, lower-mixed) a *within-subjects* factor. Again, no main effects of *emotion-within-person* ($F < 1$, partial/ $\eta^2 = .004$) or intended *emotion-as- content* ($F < 1$, partial/ $\eta^2 = .01$) were observed. As before, a significant interaction between emotion induction groups was observed [$F_{(6, 194)} = 4.20$, $p = .008$, partial/ $\eta^2 = .115$]. Exclusion of the control group had little effect on confirmation indices within this data set.

Participants in the joy, anger and control *emotion-within-person* conditions, selected a higher number of cards that matched the behaviours referenced in the conditional agreement (*p,* and *q*) in the anxiogenic content condition, than they did in response to content that was designed to evoke joy or a lower-mixed emotional state. Card selection patterns show this result is explained within the happy *within-person* group, by a higher selection of *p* or *q* cards in response to anxiety evoking content. This response was set within a high tendency by participants in the happy *within-person* condition to select behaviours referenced in the agreement (*p* or *q* but most frequently *q*), in response to content that was designed to evoke either joy or a more muted or neutral emotional response.

Within the anger *emotion-within* person group, participants selected a higher number of *p*, or *p* and *q* cards, in response to content that was designed to evoke anxiety than they did when responding to content that had been designed to evoke joy. The *p* card might provide evidence of rule violation by other. They also selected more *q* cards in response to content designed to evoke happiness (which could provide no evidence or rule violation by other). Within this group, this pattern was set against a high tendency to select cards that were referenced in the agreement.

However, in the anger *within-person* condition, participants *also* selected a higher number of cards (¬*q*) that might provide evidence of rule violation by the other party, in response to content that had been designed to evoke anxiety, than they did in response to either happy or low-mixed content.

Confirmation indices for participants in the anxiety and neutral *emotion-within-*person conditions showed a similar pattern, although in the anxious *within-person* condition, this effect was more pronounced. Participants in the neutral *within-person* condition showed a tendency to select a higher frequency of cards that matched the antecedent and or consequent (*p* and *q*, but most frequently, equally *p* or *q*) named in the agreement in response to content that had been designed to evoke joy or a lower-mixed or neutral emotional state, than in response to anxiogenic task content. This pattern was set against a high tendency to select behaviours named in the agreement. In the response to anxiogenic content, participants in the neutral *within-person* condition also selected a higher number of cards (¬*q*) that might show evidence of rule violation by the other party.

Participants in the anxious *within-person* condition showed a tendency to select a higher frequency of cards that matched the antecedent or consequent (*p* or *q*, or equally *p* and *q*) named in the agreement in response to content that had been designed to evoke joy or a lower-mixed or neutral emotional state, than in response to anxiogenic task content. This pattern was set against a high tendency to select behaviours named in the agreement. In the response to anxiogenic content, however, participants in the anxious *within-person* condition also selected a higher number of cards (¬*q*) that might show evidence of rule violation by the other part.

6.3.3.2. Falsification Indices

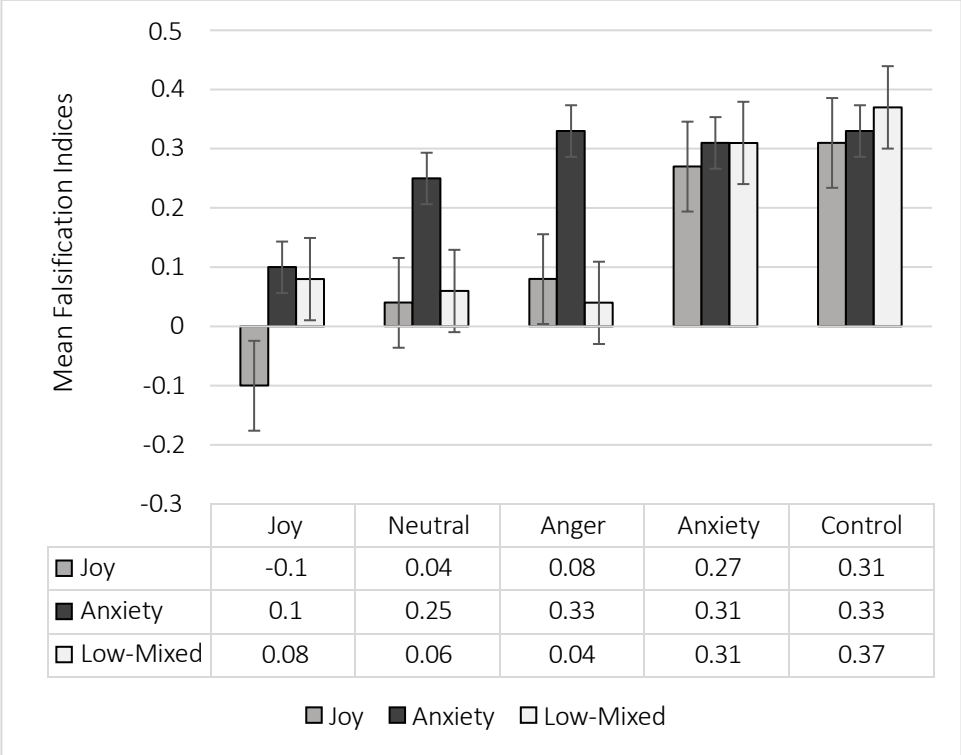
The Pollard falsification index (FI) is calculated from the scores assigned to each of the card array items for the confirmation index, using the following formula: (p + $\neg q$) – ($\neg p$ + q). This index has been used to assess 'facilitation' of performance in previous investigations with the selection task; selection of more of the items that could provide evidence of violation of the conditional agreement by the 'other'

party in these scenarios, and fewer items that can provide no evidence of this violation by them, result in higher scores. The facilitation index ranges from –2 to +2, with higher scores representing what was traditionally seen as being better deductive performance.

A mixed ANOVA was conducted with mean falsification indices by participant entered as the dependent variable, *emotion-within-person* (*joy*, *anxiety*, *anger*, *neutral*, *control*) as a *between-subjects* factor and intended *emotion-as-content* (*joy*, *anxiogenic*, *lower-mixed*) as a *within-subjects* factor (see Figure 28 for a summary of data). No main effects of *emotion-within-person* [F (4, 120) = 1.06, p = .38, partial/ η^2 = .034] or intended *emotion-as-content* [F (2, 240) = 1.85, p = .16, partial/ η^2 = .015], or interaction between these two grouping factors was observed (F < 1, partial/ η^2 = .015).

As before, this analysis was repeated without inclusion of the control emotion induction group, to assess whether inclusion of the uncontrolled variance in background emotional state within this condition was influencing analysis. A mixed ANOVA was conducted on mean falsification indices by participant with *emotion-within-person* (positive, anxiety, anger, neutral) as a *between-subjects* factor and intended *emotion-as-content* (joy, anxiogenic, lower-mixed) a *within-subjects* factor. With this alteration, no main effects of *emotion-within-person* (F < 1,) or intended *emotion-as-content* [F (2, 194) = 2.45, p = .08, partial/ η^2 = .025] were observed, but, a significant interaction between grouping factors was observed (F (6, 194) = 2.88, p = .04).

Falsification indices showed a broadly similar card selection pattern in happy, anger and neutral *emotion-within person* conditions. Participants in the joy, anger and neutral *emotion-within-person* conditions, selected a higher number of cards that could reveal evidence of rule violation by the other party (*p,* and or ¬*q*) in the anxiogenic content condition, than they did in response to content that was designed to evoke joy or a lower-mixed emotional state. Card selection patterns showed that the falsification indices were explained within the happy *within-person* group, by a higher selection of *p* or *q* cards in response to anxiety evoking content, and a lower



	Joy	Neutral	Anger	Anxiety	Control
Joy	-0.1	0.04	0.08	0.27	0.31
Anxiety	0.1	0.25	0.33	0.31	0.33
Low-Mixed	0.08	0.06	0.04	0.31	0.37

Figure 28. Interaction between *emotion-as-peripheral* and *intended-emotion-as-content* on mean falsification indices

selection of *p* and higher selection of *q* in response to content that was designed to evoke joy (*p* might reveal evidence of rule violation by the other party in these agreements, but *q* cannot; in *q*, the other party has been shown to keep the agreement, in *p*, the behaviour of the other party is unknown).

Within the anger and neutral *emotion-within* person groups, participants selected a lower number of *q* cards (which cannot show evidence of rule violation by other), and a higher number of cards (¬*q*) that might provide evidence of rule violation by the other party, in response to content that was designed to evoke anxiety, than they did when responding to content that had been designed to evoke joy or a low intensity mixed emotional or neutral state. This effect was more a little more pronounced in the *within-person* anger group, as participants in that condition selected more ¬*q* cards, which displayed rule violating behaviour by the other party

if the reverse side of that card held the required antecedent behaviour of the participant.

Falsification indices reveal a similar pattern in anxious and control *emotion-within-person* conditions; a similarly high level of checking for evidence of rule violation by the other party seemed to be evident across all three *emotion-as-content* conditions. Card selection patterns show a slight difference in behaviour between *emotion-as-content* conditions within the anxious participants. In response to anxious content, participants in the anxiety *within-person* condition select more *p* and ¬*q* cards. In response to happy and lower-mixed content, they select more *p* or *p* and ¬*q* cards, with the highest frequency being *p* cards. Card selection patterns largely mirror this pattern in the control *within-person* group. Card selection patterns of anxious and angry *within-person* groups are broadly similar in response to anxiogenic content, although participants in the anger group also select a higher frequency of *p* and *q* cards in response to anxiogenic content.

6.3.4. Feeling Label Data

The feeling labels that participants provided in their rating of selection task materials, to describe what emotions they felt whilst reading through the opening contexts, ground rules and card array items within the different scenarios, provide additional insight into card selection behaviours. Participants in the happy within-person condition, reported two main responses to the conditional agreement and card array items. Some participants reported that they wanted to see whether the other person kept the agreement, because if the other did as promised, then they had not broken the agreement. Other participants in this group reported that if the other person was not a friend, partner or colleague, they might check to see whether they had broken the agreement. They would not, however, check on a friend's behaviour to see if they had *not* done as agreed, because '*that's not the done thing – it's not okay to suspect a friend*'. The *action* of checking on a friend was seen as being unacceptable within the situations described in task scenarios, because of the damage that this might do to the relationship, and participants' feelings about the

rightness of their own behaviour. These participants tended to select the *p* card in response to the task.

Participants in the anxious *within-person* condition also provided two main responses to the conditional agreements and card array items. In some cases, participants in this group reported that they wanted to see whether the other person *had* broken the agreement *because* they were hoping that their fears would be unfounded; they would find out that the other person had *not* failed to do as agreed. This response was more frequent in happy and lower-mixed *emotion-as-content* conditions. In other cases, anxious *within-person* participants reported that they wanted to see whether the other person *had* broken the agreement, *because* they wanted to see if their worst fears were confirmed – that the other party had *not* done as they agreed. This response was more frequent in the anxiogenic content condition.

Angry *within-person* participant feeling label data was focused upon whether the behaviour described within the card array was acceptable in relation to the agreement; anger was expressed in response to *not-q*, and participant labels focused on their beliefs that it was important for both parties to do as they had agreed. Excitement was often expressed by this group of participants in response to *q* (participants were excited about what would happen next). Anxiety was expressed by many participants in this *emotion-within person* condition in response to *not-p*[37]; their anxiety was about what the other person would do next within that situation if either the participant or other party did not do as agreed. This same response to *not-p* was observed in participants in all *within-person* emotion conditions. *P* and *q* cards were mostly regarded as being positive events, although in anxiogenic *emotion-as-content* conditions, many participants also expressed relief in response to *q* (that the other person had done as they agreed).

[37] A small number of participants in this condition expressed anger at not-p, in cases where they adopted a distanced perspective within the feeling label (e.g., '*she was foolish*').

6.4. Discussion

The experimental hypotheses that were tested in this study, were supported by the significant interactions observed between groups within confirmation and falsification indices. Participants in the anxious *within-person* condition were more likely to select card array items that might show evidence of rule breaking by the other party (*p and not-q*) across *emotion-as-content* conditions. Within content conditions that were designed to evoke joy or a more neutral, lower intensity emotional state, anxious *within-person* participants tended to focus more on selection of *p*, which might show evidence of agreement violation by the other party on the reverse side. Within these *emotion-as-content* conditions, anxious participants generally seemed to be hoping that they would *not* find evidence that the other parson had broken their agreement, on the other side of these cards; this was despite a more frequent selection of this item to discover whether the other person had broken their agreement, and anxiety about the possibility that the other party had broken their agreement. In content conditions that were designed to evoke anxiety, anxious *within-person* participants selected a greater number of *not-q* cards (in addition to selecting *p*, as a single item or *p* as well as *not-q*), which displayed behaviour that would provide evidence of rule breaking by the other party if *p* was on the other side. Within the anxiogenic content condition, anxious *within-person* participants generally seemed to fear that they would find evidence that the other person had broken their agreement, either on the other side of *p* or by finding *p* on the reverse side of *not-q*. Participants who were anxious when they started the selection task, were more likely to focus on discovery of evidence that the other party had broken their agreement.

Participants who were in the angry *within-person* condition, were more likely to look for evidence that the other party had broken the agreement in anxiogenic content conditions – when they encountered anxiogenic stimuli. This response of participants who were in the angry *within-person* condition was more focused than the response of anxious participants; in angry participants it was a response to

threat, rather than a way of responding that generalized across *emotion-as-content* conditions, which was displayed by anxious participants. The feeling labels of angry participants were more focused on 'policing' the behaviour of the parties portrayed in the scenarios, to ensure that they were behaving as they *should*, after having made their agreement. The differences observed between angry and anxious participants within this study, provide evidence that treating what have been labelled as being 'negative' emotions as one group, will mask the effects that different emotions within this category are having on information processing and behaviour, at least within some circumstances.

Happy *within-person* participants were expected to select fewer cards that might reveal rule violation by the other party (*p* and *not-q*), and a higher number of cards that might show evidence of rule adherence by the other (*p* and *q*, or *q* cards). This effect was expected to be most pronounced in response to the happy *emotion-as-content* condition. This prediction was supported; participants selected fewer *p* cards (which might show evidence of agreement violation by the other party), and more *q* cards (which could not show evidence of agreement violation by the other) in response to content that had been designed to evoke joy. As predicted, participants in the happy *within-person* selected more cards that might show evidence of ground-rule violation by the other party in response to anxiogenic content (*p and not-q*, but mostly *p*), but they did so less frequently than anxious *within-person* participants in the anxiogenic, happy and neutral *emotion-as-content* conditions. In all *emotion-as-content* conditions, but particularly in the happy content conditions, participants who approached the task in a happy state were more likely to look for evidence that the other person had *kept* the agreement, than attempt to discover evidence of wrong-doing by the other party. In some participants, this was an intentional strategy that was adopted to safeguard their relationship with the person with whom they had formed an agreement. For these participants in the happy *within-person* condition, there was a cost associated with their checking for evidence that the other party had not kept their agreement, associated with the potential damage that this might do to that relationship, and their view of themselves as being good partners, friends or colleagues.

Behaving in a way that suggested one does not trust the other person, was seen as being unacceptable in their relationships with the partners, friends or colleagues described in the situations that were presented to them in this study. Protecting these relationships, by not looking for evidence that the other party had broken their agreement, functioned as a benefit for these participants in this task. Looking for evidence of rule breaking by the other was positioned as a cost. Although this strategy was verbalized by many participants in this condition, some participants may not have been aware of their reasons for card selection in this task, and some participants might have been pursuing other goals. It is not clear whether this data supports Isen's (e.g., 2000) argument that when in a positive emotional state we act to protect that good feeling state. It might be argued that participants were acting in this manner to preserve their joy, and that they were ultimately protecting their relationships with others in order to preserve their happy state. It might be argued that they were seeking to maintain or build good relationships with the other parties to avoid conflicts with them, which, if they arose, would dispel their feelings of joy. The feelings of joy that we experience from good relationships with others might be why we want to build and maintain them. This way of looking at relationships seems a little instrumental and bleak. However, the questions that these suggestions give rise to are too complex to be covered in depth here.

Oaksford and Chater (e.g., 2007) argued that our response to threat is one of automatic avoidance. They supported this argument by drawing upon evolutionary accounts of our innate fear of stimuli such as snakes, spiders and blood, that explain our flight from these stimuli in terms of an innate fear response; we fear these stimuli instinctively and take flight when we encounter them (e.g., Davidson, 1993; Mineka & Öhman, 2002). Oaksford and Chater (e.g., 2007) used this evidence to make a more general claim about what we do when we encounter any kind of threat; their claim was that in response to threat, we avoid it or run. No other account of emotion has been provided within their information gain model. This argument seems reasonable in some circumstances, such as when those people

who do fear spiders encounter spiders. The most obvious problem with their argument, is that many people do not fear or avoid or run from snakes, spiders or blood; they have no evident innate fear response to these stimuli that Oaksford and Chater labelled as being threats. We might avoid or run from other threatening objects were we to encounter them, such as wild bears, or cars that are speeding towards us with no sign of changing course. However, running from or avoiding all feared objects seems unlikely to be the best or optimum response in all situations. Oaksford and Chater's account also fails to provide an adequate account of what happens in many social settings, which can demand many more considerations than might be involved in an innate, hardwired response.

Findings of this study contradict the predictions made by Oaksford and Chater (e.g., 2007) in their rational model of selection task behaviour, about our response to threat. Although we might attempt to avoid threat if possible, this is not always the best way to respond; if we are maximisers of utility as these authors suggest, we would be sensitive to and respond to cues that suggest it might be better in this instance to deal with a threat rather than attempt to avoid it. Social relationships are not snakes, spiders, or blood. The threats associated with social relationships might in many cases be more varied, and running or avoidance might or might not be the most advantageous way to respond when faced with threats within our relationships with others. However, this argument depends upon what is gained in avoiding or facing a threat. A more nuanced understanding of behaviour, benefits and costs is required to explain our response to threat than has been provided by Oaksford and Chater.

Anxious participants in this study were more drawn towards information that might reveal or represent a threat. Anxious *within-person* participants were more drawn towards information that might reveal or represent a threat, to determine whether their fears were unfounded in happier content conditions, or confirmed in more anxiogenic content conditions. Happy *within-person* participants were more drawn towards information that might reveal or represent a threat when they encountered anxiogenic stimuli, even if tentatively or a little reluctantly.

Although a threat might be viewed as *being* something negative or unwanted by participants, as being something that might cause us harm, Oaksford and Chater's (2007) claim that threats therefore *represent* negative utility for us in their account of how we might respond to threats, and the influence of emotion on information processing and behaviour, presents a too simplistic model of utility here. We might argue that discovery of whether the other person had broken their agreement had *positive* utility for anxious participants, in that it might relieve them of their doubts about another person with whom they had a social relationship. Selection of the *not-q* card might therefore offer positive utility in this emotional condition, rather than the disutility that was predicted by these authors.

Positive and negative emotions, and positive and negative events or situations should not be simply equated with positive or negative utility. This error is made within the emotion literature when anger is positioned as a negative emotion. Anger seems to have both positive and negative consequences (e.g., successfully defending something that is valued, harming valued relationships), and both aspects need to be represented in an adequate model of anger. The same is true of emotion, threats, and utility more generally. It might be that we need to add an additional term to accommodate emotion within the information gain model (so we have subjective utility, subjective or expected likelihood, and emotional utility). The separation of emotional utility from non-emotional utility might be necessary so that the effects of emotion can be adequately included within our calculation. It also seems important to include *separate* elements within this for pluses and minuses, or gains and losses, rather than to treat these as though they can be collapsed onto one dimension and subtracted from or added to one another in a way that erases their presence in the sum. Although this is how utility is measured in the information gain model, as it is in many Bayesian models of benefits and costs, it seems unwise to view events that represent different personal gains and losses, and different degrees and kinds of gains and loss, as being equivalent if we want to adequately model human behaviour.

For example, imagine finding out that a friend or colleague had done something

that harmed you. We could count this as a loss. In one case, let us say that this friend was your best friend who you had known for many years. Should we weight this factor, so that a greater cost is needed in this case than might be for a little-known acquaintance, so that it is counted as a cost in the event of negative events? Imagine this friend did whatever they did that harmed you in the mistaken hope that their actions would help you. Should we count this factor as a gain? Or should this information be used to mitigate, or remove or lessen the cost of their behaviour? In another case, imagine this friend was your best friend who you have known for many years, and they acted thoughtlessly without thinking about how their actions might harm you. Should we count this information as an additional cost (it might feel like an additional cost)? Or should we add this information to the loss, to signify that there are no mitigating factors here? In another case, let us say that the friend is someone who you have known for years, and they have done things that have harmed you in the past, several or many times, but in this case their actions also benefitted you as well as causing harm. In another case, let us imagine that the colleague is someone whom you dislike, perhaps intensely, but it would be unwise to do anything that might put you at a disadvantage to them; they can negatively affect your career. In another case, the colleague is someone whom you dislike, and there is good reason to believe that they acted with the intention of causing you harm. Let us now say that in each case the cost might be objectively valued as being equivalent, if we ignore the relationships, our feelings about the other person, our history, and the other benefits and costs that have been accrued within these relationships over the years.

These are very simple cases, and yet, even in these it seems that we need some way of representing the relationships, our historic context of gains and losses, and the importance of those to us, and the possible consequences of our behaviour (perhaps again estimated in terms of expected benefits and costs), to understand how we might *feel*, *think* and *behave* in response to the examples presented above. Not including these factors within our equation will result in a poorer model and prediction of reasoning, decision making and behaviour. An element that signifies

emotional utility might allow us to more closely model and predict behaviour. The new selection task perhaps offers a very limited way to model this kind of situation, but it provides a way of investigating these kinds of realistic, potentially important decision contexts that other experimental tasks do not.

The determination of whether we *are* facing a threat, and what kind of threat is faced, might require additional information processing within many social settings. In circumstances that seem likely to contain threats, we might spend more time checking our surroundings to discover whether there are any threats present. Once an object, behaviour or event has been appraised as *being* threatening, we might then withdraw (e.g., physically, or by withdrawing processing resources), hide, or run to avoid the threat, if this behaviour seems beneficial or wise in the circumstances. We might avoid threatening information in some settings, in other settings we might not. Running or avoidance might in some circumstances result in greater harm than good. A more comprehensive understanding of fear or anxiety is required to understand how this kind of emotion might influence human behaviour in different settings. Anger is another common response to threat, and the impulses associated with anger might be to approach, in order to attack, depending upon the intensity of anger felt, and the expected consequences of that attack, which might result in greater perceived benefit or cost (e.g., to relationships, physical safety, job security).

Participants in this task were doing more than simply selecting the cards that had been pointed at within the instructions, and contrary to the strong claims made by Sperber et al., (e.g., 1995; 2002) that participants do not reason within this task, there is clear evidence within the data obtained within this study that many participants were reasoning in this selection task. In a further challenge to their relevance account of human reasoning and behaviour, participants in this task were doing more than determining the linguistic relevance of card array behaviours in relation to the conditional rule; they were also thinking about how to act, and what the costs and benefits of those acts might be within the contexts within which they made the selections.

The social relationships between parties who engaged in the social contracts within the situations presented within this task, are intended to be ones that might be based on trust, although this is not explicitly stated in any of the selection task materials; most agreements are made between friends or dating partners. The degree to which they might be based on trust, perhaps varies between scenarios. Eight agreements are made between partners, two are between people who are on a first date, one is between people who have just become friends, six are between friends, and one is between two people who have just met on a work-related week away. There is no content within the narratives that suggests any reason for not trusting the good faith of the other person with whom they made the agreement. The cheater detection paradigm approach that was adopted in many previous deontic versions of the selection task, of telling participants that there were good reasons to believe that the other party would break their agreement, and then asking them to select evidence of that cheating from within the card array, was not adopted here. No cues were provided that would obviously lead participants to distrust the other party's intentions, to believe that they made the agreement in poor faith, or to suspect that the other party might break their agreement.

However, whether participants will expect or trust the other party to keep the agreement might depend upon their own learning histories and relationships, in addition to their current emotional state. Anxious participants in this task were more likely to look for evidence that the other party had broken their agreement, but they were not always expecting only to find evidence of ground-rule violation. In happier or more neutral conditions, they were often hoping that their fears would not be realized. If participants' relationships with friends and partners are largely based upon trust, then it seems probable that they would regard the portrayed relationships in this same way; if they are not, then participants might approach the agreements with a lower expectation that their friends or partners will do as they agreed. The relationships contained within the scenarios that were constructed for this first selection task, are ones that we might want to build, strengthen or support, even with the work colleague. Additionally, there might be

costs that result if we behave poorly towards the other party within these relationships, such as arguments, ongoing negative tensions, long lasting damage to or dissolution of the relationship. The nature and consequences of those costs are uncertain. There may be other situations in which it would be more acceptable not to trust the person with whom we have entered into an agreement – if a relationship has already been badly damaged, or if you might gain a competitive edge against a colleague by doing so, for example, or if there are no obvious costs associated with checking their behaviour, or if the benefits of checking their behaviour outweigh associated costs. If these situations were portrayed within the selection task, selection of the *not-q* card might be more common than it was in the current task.

This consideration brings us to the lack of 'facilitation' observed in the data obtained within this study. The main probable reasons for this have been discussed above. One is that the cheater detection paradigm technique, which has been positioned as the most likely stimulus to this effect, was not adopted in this study. Another is the nature of the relationships and agreements that were presented in these studies, and the costs and benefits that might be associated with finding evidence of rule breaking within them. The data obtained within this study, provides a good idea of what participants might have been doing in this task when they selected the cards in the different *emotion-as-content* conditions. This behaviour seems to provide a plausible model of how participants might behave in these relationships beyond the experimental setting. The lack of general facilitation observed in this study presents a challenge to Cosmides' (e.g., 1989; Cosmides & Tooby 2000; 2005) account of behaviour within the selection task, and of how we behave in social contracts. The participants in this task were not all focused upon the task of detecting cheaters; the expectations, or inferential biases or processing strategies that have been associated with emotional state, and concerns about their relationships, seemed to influence participant behaviour in this task.

Cosmides has paid very little attention to private social contracts, although she refers to them explicitly within her theory. Cosmides seems to argue that we

behave within these contracts in the same way that we behave within social contracts with the state. She has given no consideration to the fact that there might be costs associated with the detection of cheating within social relationships, or that these costs might influence information processing or behaviour. Her account of our response to threat is much like the one presented by Oaksford and Chater that was discussed above, and has the same limitations and omissions. Although we might respond to some relationships or threats in the same way that we respond to snakes, or spiders, or blood, there are often other concerns that influence our thinking and decision making when deciding how to act in social relationships with other people.

The navigation of social relationships can require us to behave in ways that demand a more careful consideration of the nature of what costs and benefits might be a stake, when considering how best to behave. Previous investigations with the selection task, and other investigations of human thinking, have given very little consideration to these factors. Current decision theoretic, relevance and information gain models of human thinking and decision making (e.g., Evans, 2007; Evans & Over 2004; Oaksford & Chater, 2007; Sperber et al., 1995; 2002), fail to consider these issues in their accounts of behaviour, and are underspecified in their accounts of human emotions and relationships. Given the reach of human relationships within most areas of life, and the prevalence of emotion, perhaps often at low levels, this gap is significant.

The importance judgements made by participants in the rating task, were higher than expected. Most of the conditional agreements that have been developed for this first selection task, are intended to concern mundane, everyday practical arrangements that do not have great significance or value to the parties concerned beyond their preferences for how to navigate or arrange a social situation. They are not intended to be related to important goals, or situations that might impact significantly upon one's wellbeing. The agreements were about where to have dinner, where to meet after your train arrives at the station, allowing one person to get away to pick up a parcel, choosing what to drink with your meal, what to do if

one party falls off their sledge, whose house you will return to and who will drive. Three of the scenarios contain potential threats to one's safety (driving, leaving and sledging), and so these scenarios might be viewed as being more important, and then perhaps responded to differently within the selection task. However, there no differences in importance ratings or in card selection patterns between the scenarios used in this study. As all agreements are made between people within a social relationship, it may be that the potential impact of rule adherence or rule violation by either party upon that relationship, might have been valued or regarded as being important to the people involved in the relationship. There may be important costs and benefits associated with rule adherence and rule violation, and the discovery of rule adherence or rule violation, for oneself and others within a relationship.

Outcome importance ratings differed significantly between *emotion-as-content* conditions, and the same was pattern observed across *emotion-within-person* conditions. Avoidance of a negative outcome was seen as being more important than achieving a positive outcome in all *emotion-as-content* conditions, and as being particularly important in anxiogenic content conditions. Outcome importance ratings of content that was intended to evoke low intensity or neutral emotions, were similar to those given for content designed to evoke a mild to moderately intense level of joy. This observation was unexpected, as it was assumed that outcome importance would be higher in the higher *emotion-as-content* conditions (i.e., happy and anxiogenic). Participant feeling label data provided some insight here. This data shows that participants were concerned about the possible outcomes associated with the behaviour of both parties in the low-mixed-neutral content conditions; that their failure to keep the agreement might give rise to arguments, disagreements, and prolonged periods of unease within relationships (participants referenced great difficulties in their relationships with friends, partners and colleagues in their feeling label data, that had resulted from what might be seen as being trivial incidents, when alongside their importance ratings). The outcomes within what were designed to be stimuli to very low intensity emotions or neutral states, were therefore seen as being important. This outcome

importance judgement might have been made in the absence of any necessary emotional response in the low-mixed *emotion-as-content* condition, and the judgement might have been a cold one; the emotional ratings for these conditions were low, as intended. The hypothetical consideration of what might happen if either party had broken their agreement, behaviour that might then give rise to an emotion were it to happen, might have given rise to the importance judgement in the low-neutral content condition. This suggestion is supported a little by the emotional ratings given to *not-q* items and the remainder of the content in the low-mixed *emotion-as-content* conditions. *Not-q* behaviours evoked moderate to high levels of anger in many participants; the remainder of the content evoked low levels of emotion or neutral responses.

Preservation of a good relationship and finding evidence that the other party had not broken the agreement seemed to be important goals for participants in a happy emotional state; there was evidence of this in both *emotion-within-person* and emotion-as-task content. This goal seemed to be *most* important for participants in the happy *within-person* group when they encountered content that was designed to evoke happiness – so, when happiness was most intense. Confirming or disconfirming fears that the other person might have broken their agreement, was an important concern for anxious participants, and particularly for participants who were in the anxious *within-person* condition. The overall intensity of importance ratings might have been affected within this task, by the way in which participants use rating scales when making judgements; the outcomes within these scenarios might seem important until something like a life-or-death experience adjusts one's valuation of what *very important* (8) or *essential* (10) means. In this way, participants' rating of how important the outcomes in these scenarios were to them, might reflect our assessment of importance beyond this experimental setting, which can be heavily influenced by the context in which we make the judgement.

The absence of main effects in either confirmation or falsification indices within this study perhaps indicates that the emotions evoked within the autobiographical

recall task were not sufficiently intense or clean to produce the expected effects there. The autobiographical recall task did seem to evoke a high degree of variance in participant emotions. This variance might be the result of a different degree of engagement with the task between participants, different degrees of success between participants in their recall of events that evoked strong feelings of joy or anger or anxiety or a neutral emotional state, and or the result of the range of emotions that were evoked when participants recalled these events (as discussed above in the analysis of DES scores).

A great deal of thought and time has been devoted to the development of a new selection task that allows us to investigate the influences of emotion on thinking about familiar, everyday pragmatic social contracts, that are set within realistic decision contexts. The content that was developed for the different *emotion-as-content* conditions, to evoke joy, or anxiety, or much lower intensity emotions were perhaps also messy, in that they evoked other emotions within the *emotion-as-content* conditions in additions to the ones targeted in those conditions. The opening scenarios functioned as intended, and evoked mostly joy, anxiety or lower-intensity or no emotions in the appropriate conditions. The messier emotions (those not targeted within this research study), much as they had been in the rating task reported in the last chapter, were evoked by the conditional agreement in anxiogenic content situations (which evoked a mixture of hope, happiness, relief and anxiety in may participants), by the *not-p* card in all *emotion-as-content* conditions (which evoked mostly anxiety or guilt or little feeling), and by the *not-q* card, which evoked anger and anxiety in all *emotion-as-content* conditions. It may be that when we create a context that more closely approximates a realistic, social decision context, that it will be difficult, perhaps impossible to study the effects of emotion in isolation from one another. It might be worth repeating this study with a different task used to manipulate background emotional state, that requires little effort on the part of participants (such as exposing participants to film clips, or a mixture of images and words), to see if cleaner *emotion-within-person* groups could be created and then examine the effects of this on task behaviour.

The inclusion of a control group in this study, in which there was no manipulation of background emotional state before the start of the task, demonstrated the importance of manipulating emotional state, or of considering background emotional state when investigating what effects emotional content or information might have on information processing and behaviour. Without the use of the *emotion-within-person* group within the study, the interactive effects of *emotion-within-person* and *emotion-as-content* would have been masked in this study.

6.5. Summary

The first study with the new selection tasks that were developed within this research programme was presented in this chapter; the study details have been presented, an analysis of the data has been presented, and the data have then been discussed. The data and discussion presented here have provided convincing evidence that if the many variables that have been shown to influence participant behaviour in previous selection tasks are controlled, this task can be used to investigate what factors influence participant behaviour in this selection task. More than this, the study and discussion presented here has demonstrated that participants seemed to be reasoning in this task, and that their selection behaviour was influenced by important pragmatic concerns and goals that were relevant to the decision setting. The findings reported and discussed here also provide evidence that the negotiation of social contracts have been underspecified in previous published investigations and discussions of the selection task. Thinking about and deciding how to act within social contracts that involve personal relationships, might involve more than then a concern for detecting cheaters; the consequences of finding or looking for evidence of cheating within these relationships seemed to be an important concern for participants. Evidence has also been presented that participant behaviour in this task was influenced by emotion (within-person, and within-content conditions). Anxious participants, for example, seemed to be more focused on information that might reveal evidence of

cheating, and to be so particularly in response to anxiogenic content. Happy participants seemed to be more determined to find evidence that the other person kept their agreement in response to anxiogenic content. The data obtained in this study suggests that anxiety, anger and happiness might have reliable and different effects on reasoning, decision making within the kinds of decision context that were presented in the new tasks. Furthermore, the data also demonstrates that these kinds of effects might be investigated with the new selection tasks.

Chapter Seven. The Second Selection Task.

Chapter seven presents the second study that was conducted with the new selection task. This study was designed and conducted in response to critical advice from Manktelow, that the absence of a facilitation effect in the first study presented major difficulties; many previous investigations with selection task in which no facilitation effect had been observed, had not been published. Manktelow argued that there might be difficulties with the task, or with participants' understanding of the task. Possible remedies to these issues were investigated within this study; the conditional and card array items were extended across time, the card array format was changed so that the task might seem more realistic to participants, and a third party who checked or evidence of rule violation was added to the experimental design. These adjustments to the design, and the selection task study that was conducted with these adjustments included within the design, are presented in this chapter. The data obtained from this study are also presented and discussed.

7.1. Introduction.

7.1.1. Absence of the Facilitation Effect.

Following the completion of the first selection task study, which was reported in chapter six, Manktelow (personal communication, September, 2008)[38] argued that the lack of facilitation in the selection patterns posed a major problem for this new task; unless the facilitation effect was obtained in studies with this task, he argued, there would be no research interest in the task. This argument was based on his experience with previous versions of the selection task; studies in which no facilitation occurred had not been published within reasoning Journals. In many previous, unpublished versions of the selection task, researchers had failed to

[38] Ken Manktelow was consulted for advice during this research programme. This followed his suggestion that the first study would not publish because of the absence of the facilitation effect within the data, which, at that time, seemed to be an important requirement for research studies with the selection task.

obtain a facilitation effect and it was not clear what was driving performance in those tasks; the data was very messy (Ball, personal communication, September 2010; Manktelow, personal communication, September, 2008). Given the lack of control of key variables that had been shown to influence reasoning and decision making in published versions of the selection task within previous investigations with the selection task, it is highly likely that their operation within many unpublished studies was uncontrolled and difficult if not impossible to discern. It is not surprising that clear explanations for messy selection behaviour in those tasks could not be found. When some control of key factors that have been shown to influence reasoning and decision making is achieved, it is possible to understand what participants might be doing in this task, and in achieving this we gain a greater understanding of reasoning and decision making beyond the selection task.

Participants might or might not be reasoning deductively within this new selection task; they might also be doing something that seems more important than that in the decision contexts that were presented to them in the new task. The first selection task study had not been advertised as an investigation of intelligence or deductive reasoning; it was advertised as an investigation of everyday decision making. There was no reason for participants to imagine that they were being asked to treat the task as a test of their deductive reasoning ability, or that their intelligence would be assessed within this task. There was clear evidence within the feeling label data obtained in the first selection task study, that many participants understood the task; they understood that turning over the *p* or *not-q* cards might show that the other person had broken their agreement. Understanding this feature of the task, did not automatically result in participants selecting those cards; many participants were perhaps not attempting to demonstrate their intelligence, or to show that they understood the instructions and the card array, when selecting their cards in this task. Many participants seemed instead to be attempting to navigate a social relationship with a friend, partner or colleague, and deciding how to act within that relationship within the selection task.

7.1.2. The Card Array as Behaviour on Different Occasions

Nevertheless, Manktelow argued that there were two possible problems with the new selection task. These problems, he argued, would make it very difficult for participants to understand the task. Both were associated with the card array items, and one was caused by 'who' was checking for rule violation in the selection task. The card array in the first selection task had been presented as follows

> Following the agreement you will see four pieces of information that represent possible episode outcomes, or events that might follow the agreement; each of these pieces of information will be displayed on a separate record card. On one side of each record card is information about your actions after agreement to the ground rule, and on the other side of each record card is information about the actions of your friend, partner or colleague after agreement to the ground rule in the situation described. You can see what is written on only one side of each of the four cards, and so you have only partial access to information about the four episode outcomes.

Card array items thus represented behaviours of the two parties to the joint agreements, after they had agreed to abide by a ground rule. These behaviours had been presented as outcomes that *might* follow the agreement, that is as hypothetical events. Manktelow argued that participants could logically select only one card from this array; the outcomes are logically, mutually exclusive, and selection of one card prevents the selection of any other cards from the array. If one of these outcomes happened, then the others could not also happen; participants would assume that the rule was a one-off occurrence, and there could thus be only one concrete outcome. Although the task requires hypothetical reasoning, Manktelow argued, participants would not entertain one than one logical conclusion if they understood the task.

In previous deontic versions of the selection task, card array items were hypothetical instances of either behaviours that occurred at different points in time, or the behaviours of different people at one point in time[39]. In those tasks,

[39] In some tasks, objects such as lorries or widgets were used in place of human behaviour or characteristics. However, the same format was used; the behaviour or characteristics of the same object at different time points, or the behaviour or characteristics of different objects were represented within the cards.

participants had to decide which of these hypothetical possible outcomes, might show evidence of rule violation or adherence. Although the task itself requires hypothetical thought, and although we engage in a great deal of hypothetical thought, Ken argued that the first of the new selection tasks presented a greater level of complexity because of these design features; he believed that card selection patterns might have been restricted *because* the card array items in the first selection task were mutually exclusive events. This feature of the task, he argued, might have confused participants, and the selection patterns reported in chapter five were therefore no more than the result of participants' failure to understand the task. If participants had understood the task, then they would have reasoned according to the principles of deductive logic, according to Manktelow.

7.1.3. Record Cards and Looking for Evidence of Rule Violation

The second problem identified by Manktelow, was the unrealistic nature of participants' task. In the first study with the new selection tasks, participants had been told that the possible behaviours of themselves, friends, partners or colleagues following an agreement had been displayed on record cards, and they were asked to decide which cards they would need to turn over (which bits of information they would need to check) to find out whether or not their friend, partner or colleague broke the ground rule in the situation described. No rationale had been provided to explain why their behaviours were being displayed on record cards. It would certainly be unusual to keep record cards that held information about the behaviour of oneself, friends, partners or colleagues, whether you had agreed to ground rule or not. It would also be odd to be asked to select from an array of record cards to see whether or not your friend, partner or colleague had broken an agreement. Although it might be possible to work out what was being asked of one in the task, this is not something that we do in our everyday lives. Some participants *might* therefore have been confused by this aspect in the first selection task. Manktelow argued that facilitation was often achieved by the use of a third party who holds a position of authority, or has a reason for keeping records of behaviour, or for checking records that have been kept by another party.

The facilitation effect had not been sought in the first study; although the new task might be used as a test of deductive reasoning, it had not been used there to test competence in deductive reasoning. However, it seemed important to ensure that participants could understand the selection task, and that they were not presented with elements that led to confusion within this task. Task instructions had been tested in an effort to ensure that participants could understand what was being asked of them in the task. However, some participants might have struggled to understand the task, and some might have been confused by it. There is not sufficient data to determine whether either event occurred. It also seemed important to improve the ecological validity of the selection process within the task, so that this part of the task more closely approximated something that we might do within our everyday experience.

7.1.4. Revisions to Conditional Agreements, Card Array and Task Instructions

The new selection task was therefore revised to address these difficulties. The conditional agreements that were used in the first selection task were extended across time, so that they applied to the behaviour of both parties within a set time period. The card array items (*p*, *not-p*, *q*, and *not-q*) were portrayed as instances of the behaviour of both parties at different points in time (i.e., what one party did on one occasion following the agreement, and what the other party did in return). Card array items were also presented as diary pages (one page for each card), on each side of which were recorded the behaviour of themselves and the other party after their agreements. A diary (record) keeper was introduced to participants within the task instructions, and participants were provided with a plausible rationale that explained why these accounts of behaviour had been kept. To follow Manktelow's advice, a third party was introduced as the diary keeper. To provide a comparison with data that was obtained in the first study, and a comparison for the diary pages data that would be obtained in this study, the record card method of record keeping was also included within this study.

The record keeper was operationalized within this study to introduce a further test of perspective effects. The record keeper was positioned as *self* (i.e., the perspective described in the opening contexts, conditional and card array items in

the selection task) or *other* (someone who was not part of the events described in the scenarios). The introduction of these two perspectives would allow exploration of what would happen if participants adopted the role of a third party when reading the *emotion-as-content* scenarios. These content conditions had been designed to evoke either joy, anxiety or a lower-mixed neutral state when read from a first-person perspective, in which participants imagined themselves within the scenario, and that they were experiencing the situations as they were described. It would be interesting to see what effect the *emotion-as-content* variable might have on card selection from a more distanced third-person perspective. We can feel *happy-for*, and *anxious-for* others. It would be interesting to see if this greater distance from the situation and relationships portrayed within them, resulted in different concerns, and different responses within the selection task, than had been expressed or demonstrated by participants who imagined the portrayed relationships to be ones that they held with friends, partners or colleagues.

7.1.5. Revisions to Emotion-as-Content Conditions.

The ground rules used in study one were adjusted very slightly so that they extended across time. This extension was in ground rules was fairly easily achieved in four of the six scenarios. In two of the scenarios used in study one, extension of the rule in this way did not make sense, and so these two scenarios were not used in this study. In the leaving to collect a parcel scenario, it seemed implausible that a friend might stop you repeatedly within a short space of time, whilst you were on your way out to collect a special delivery, and that you might then set up a ground rule to manage how you would negotiate that situation in the coming weeks. The content of the scenario and the ground rule would need substantial remodelling to make it work across time. The train journey scenario in the happy and anxious versions, depended upon the delivery of good or bad news, whilst the two people were alone before going to dinner with other people. It depended upon them meeting at the station, because time was limited for communication. It would not be convincing that the same scenario might arise on more than one occasion in the coming weeks, or that you would create a ground rule to manage that situation. The content might be remodelled significantly to effect the change across time, but

that would require construction of a different scenario. A little adjustment of content within the opening contexts of the remaining scenarios, was required to accommodate the agreement extension across time, so that it sat easily within the situation portrayed in each of the *emotion-as-content* conditions. The card array content remained unchanged within each of the task versions; the behaviours presented within the card array worked equally well in the original and the now time-adjusted versions.

Participant ratings of selection task materials at the end of the first selection task, had provided evidence that the portrayal of some behaviours within scenarios, might evoke anger in some participants in the anxiogenic and lower-mixed-neutral content conditions. This behaviour was therefore altered slightly so that it might be appraised as being less blameworthy in the situations portrayed (in the restaurant, driving and lodge settings). This adjustment was made to attenuate the possibility of this content evoking anger in participants within this study, tighten the emotional nature of opening contexts, and increase the probability that they would function as effective stimuli to the intended emotional responses (i.e., joy, anxiety, or lower-mixed-neutral). It may not be possible to avoid evoking anger in some participants, when they are presented with stimuli that evokes anxiety, or is appraised as being a threat, as anger is a response to threat. We can feel anger in response to the 'behaviour' of objects, such as computers or mobile phones; an object or person needs only to be appraised as *being responsible* for the event that is making us angry, assigning responsibility or blame need not be an accurate or fair way of appraising events (e.g., Ortony et al., 1988). However, by attenuating any suggestion of blameworthiness, or taking the focus away from behaviour (which might be appraised as being blameworthy), it might be possible to reduce the probability that anger will be evoked in response to these stimuli. The revised versions of this task were again rated for emotional nature before the selection task (N = 12), using a revised version of the procedure reported in chapter five. In this rating task, participants were asked to imagine that they were in the scenarios described, and that they were experiencing the event as it was described. In the data obtained from this task, the aspects of behaviour that had evoked anger, were much less salient in participant responses. No participants in this task responded

with anger to the revised opening scenarios, although anger was still a common response to *not-q* cards.

Hypotheses

This second study was largely exploratory; it was conducted to investigate whether these alterations influenced card selection in the new task. This would allow an investigation of Manktelow's arguments about the new tasks. It also provided an opportunity to test participants response to the altered format of the card array and record keeping arrangements, and to the *emotion-as-content* stimuli from a more distanced perspective.

With no manipulation or measurement of *emotion-within-person*, the effects of *emotion-as-content* may be masked within this study. If the elements highlighted by Manktelow had suppressed a facilitation effect, as he suggested, in the first study, the removal of these difficulties might result in higher falsification indices within this study, particularly perhaps within the anxiogenic content condition. However, the scenarios that were used in study one, were also used in this study. In these, the relationships and concerns about these that were expressed by participants in the first study should remain, particularly for participants who are in the *self* conditions. Participants who adopt a more distanced stance in this study, might select more cards that could show evidence of rule violation, as they might be less affected by concerns about the relationships portrayed within the scenarios, and the consequences of their selecting card array items (or turning over diary pages).

7.2. Method

7.2.1. Participants

Sixty adults from the University of Leeds, drawn from undergraduate and post-graduate students in the Schools of Engineering, Law, Medicine, Business and English, participated in this study (male N = 30, age M = 20.23, SD = 1.38; female N = 30, age M = 20.50, SD = 2.03). Participants were recruited by opportunity sample within the Edward Boyle library. No participants had taken part in any of the previous tasks conducted within this research programme, and none of these participants had had been enrolled on reasoning or decision-making modules.

7.2.2. Design

A 2 *card-array identity* (record cards, diary pages) x 2 *perspective* (self, other) x *3 emotion-as-content* (happy, anxiogenic, lower-mixed-neutral) design was utilized for this study. *Card array identity* and *perspective* were operationalized between-subjects to avoid carry over effects, and *emotion-as-content* was operationalized *within-subjects*. Within the selection task instructions, the card array, which contained the behaviour of the two parties to the agreement, following that agreement, was presented either as four record cards, as it had been in study one, or as being four diary pages, which contained a record of events over the past few weeks following the agreement. When reading the scenarios, participants were either instructed to imagine that they were in the scenarios described, and that they were experiencing the event as it was described (*self*), or that the scenarios contained an account of events that took place, during which two friends, partners or colleagues had come to an agreement (*other*). The card array identity and perspective groups were imperfectly crossed in this study. In the *self* condition, participants were presented with either record cards, or diary pages. The diary pages were either pages from their own diary, in which they had written about events that had taken place over the past few weeks, *or* they were the diary pages of a friend (which might be treated as other) who had been at the events described, and had written about those events over the past few weeks. In the *other* condition, the card array was presented as diary pages, which were from the diary of one of the people who had agreed to the ground rule in the episode described, and had written about events that had happened over the past few weeks following their agreement. To repeat the presentation of record cards in study one, no rationale was provided for why the behaviour of the two parties had been recorded on record cards in this study.

Four slightly different selection task instruction versions were used in this study. The task instructions that were used in study one were adjusted to accommodate the extension of ground rules across time. This adjusted version was used for participants in the *record card* condition. Task instructions were then adjusted to present the card array as the *diary pages* of either *self* or *other*, rather than record

cards. In all three versions of these task instructions, participants were asked to imagine that themselves in the situations described in the scenarios presented to them, and that they were experiencing the events as they were described. In the final *between-subjects* condition (*other*), participants were told that the scenarios contained descriptions of events that took place between two friends, partners or colleagues, during which they came to an agreement (see Appendix 13 for task instructions). As they had been in study one, the task instructions used in this study were a soft, rule-violation version; participants were asked to decide which cards or diary pages they needed to turn over, to find out whether or not the other party had broken their agreement. As before, task instructions were tested for comprehension before use in the selection task, to ensure participants could understand what was being asked of them within the selection task (N = 12).

Emotion-as-content was treated as a within-subjects variable. Participants were presented with one *emotion-as-content* version of three different selection task scenarios, and so they completed one *joy*, one *anxiogenic* and one *lower-mixed-neutral* version of the selection task in this study. Card selection frequencies (*p*, *not-p*, *q*, *not-q*) acted as the dependent variable. Intended *emotion-as-content* conditions from each of the scenarios were counterbalanced across participants to allow for a more robust test of the effects of intended *emotion-as-content*. The presentation order of intended *emotion-as-content* conditions and each of the scenarios, were counterbalanced across participants, as was the card array presentation order positions within every selection task that was presented in this study; six card array orders were used to achieve the latter. Participants were randomly allocated to experimental conditions using random-numbers table.

7.2.5. Ethics

Ethical clearance for this study was obtained via the self-certification scheme from the Institute of Psychological Sciences Ethics Committee at the University of Leeds (Reference No. 08272-02). The design and conduct of this study adhered to the British Psychological Society's (BPS, 2014) code ethics for research with humans.

7.2.6. Procedure

This study was conducted within the Edward Boyle Library, at the University of Leeds. Participants were recruited opportunistically, within the study areas of this library (see Appendix 11 for participant information sheet). Following completion of participation consent forms (see Appendix 12 for consent form), participants were allocated to one of the experimental conditions (record card, *N* = 15; self-self-diary *N* = 15; self-other-diary *N* = 15; other-other-diary *N* = 15). All tasks were presented and completed in paper and pen format. Participants read through task instructions to ensure comprehension before starting the selection task. Participants then completed three versions of the selection task (1 x joy, 1 x anxiogenic, 1 x low-mixed-neutral), within in a single experimental session. Participants completed the task separately, and they were debriefed after selection task completion. Time for task completion varied from approximately twenty to thirty minutes.

7.3. Results.

7.3.1. Card Selection Analysis.

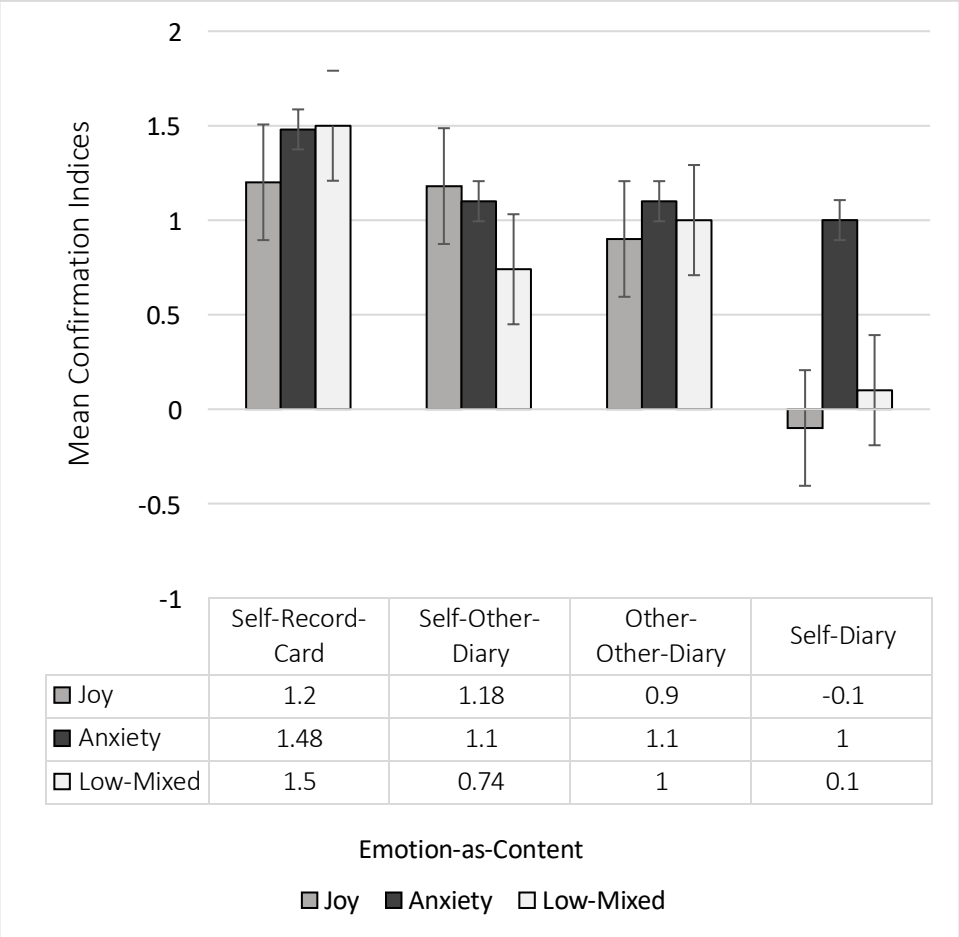
Card selection frequencies were assessed using the confirmation and falsification Pollard indices (e.g., Pollard & Evans, 1987). There were no significant differences in Pollard indices between any of the scenarios used within this study, and so the following analysis has been conducted with card selection frequencies collapsed across scenarios.

7.3.1.1. Confirmation Indices

A mixed ANOVA was conducted on mean confirmation indices by participant, with *group* (self-record-card, self-diary, self-other-diary, other-other-diary) entered as a *between-subjects* factors, and *emotion-as-content* (joy, anxious, lower-mixed-neutral) entered as a *within-subjects* factor. No main effect of *emotion-as-content* was observed [$F < 1$]. A main effect of group [$F_{(3, 56)} = 13.29$, $p < .001$] was observed. Bonferroni post hoc comparisons showed significant differences between the self-diary condition and each of the other group conditions. There was a significant difference between *self-diary* and *self-record card* ($p < .001$), with higher

confirmation indices in the *self-record-card* (no rationale) condition than in the *self-diary* condition. There was a significant difference between *self-diary* and the *self-other-diary* condition ($p < .001$), with higher confirmation indices in the *self-other-diary* (with rationale) than the *self-diary* (with rationale) condition. There was also a significant difference between the *self-diary* and *other-other-diary* conditions ($p < .001$), with higher confirmation indices in the *other-other-diary* (with rationale) than the self-diary (with rationale) condition.

A significant interaction between *group* and *emotion-as-content* was also observed [$F_{(6, 112)} = 2.33$, $p = .024$] (see Figure 29 for a graphical summary of data).



	Self-Record-Card	Self-Other-Diary	Other-Other-Diary	Self-Diary
Joy	1.2	1.18	0.9	-0.1
Anxiety	1.48	1.1	1.1	1
Low-Mixed	1.5	0.74	1	0.1

Figure 29. Interaction between *group* and intended *emotion-as-content* on confirmation indices ($p = .024$).

Confirmation indices were highest overall on the *self-record-card* condition, in which participants imagined themselves within the scenario described and selected from cards that had been presented as record card without a rationale for their collection or for their being presented in this manner. There was a slight variation in confirmation between *emotion-as-content* conditions within this group, but this was not significant. Participants in the first selection task had been in this condition, although the conditional agreement and card array items had been extended across time in this study.

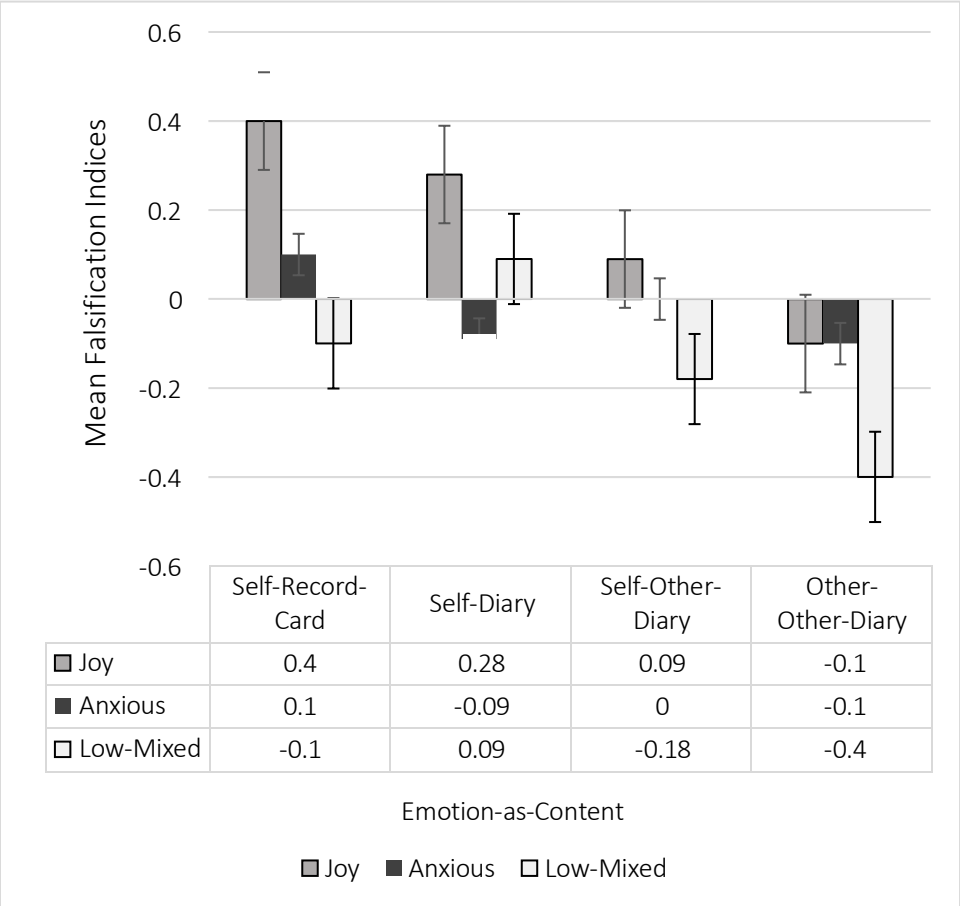
The most extreme difference between conditions occurs within the *joy* and *lower-mixed emotion-as-content* conditions, between the *self-diary* condition and all other group conditions. In the self-diary condition, participants had imagined themselves within the situation described, and were asked to check their own diary pages for evidence that the other party (a friend, partner or colleague) had broken their agreement. In this group, participants selected more cards that might provide evidence of rule adherence by the other party in response to anxiogenic content, than they did in either the happy or low-mixed *emotion-as-content conditions*. Between groups, however, participants in the *self-diary* condition selected fewer cards that might show evidence of rule adherence by the other party in the anxiogenic content condition, than did participants in the other group conditions. In the *self-other-diary* condition, confirmation indices are slightly lower in response to lower-mixed emotional stimuli, than they are in response to the higher intensity anxiogenic and joy *emotion-as-content* conditions. Participants in the *other-other-diary* condition achieved their highest confirmation indices in response to anxiogenic content than to content that was designed to evoke joy or a lower-mixed-neutral state.

6.3.1.2. Falsification Indices

A mixed ANOVA was conducted on falsification indices by participant, with *emotion-as-content* (joy, anxiogenic, lower-mixed-neutral) as a *within-subjects* factor, and *group* (self-record card, self-diary, self-other-diary, other-other diary) treated as a *between-subjects* factor. No main effect of the grouping factor was observed for falsification indices ($F < 1$). A main effect of *emotion-as-content* was

observed [F (2, 112) = 7.00, p = .002]; with the grouping factor collapsed, falsification indices were highest in conditions that had been designed to evoke joy, and lowest in conditions that had been designed to evoke a lower intensity mixed or neutral emotional state. There was, however, a significant interaction between *emotion-as-content* and *group* [F (6, 112) = 2.55, p = .027]. The results of this analysis are presented in Figure 30.

Falsification indices were highest in the card array as record card condition, in response to content that was designed to evoke joy. Participants in this condition made a higher selection of *p* cards here, as did participants in the self-diary condition; participants in both groups reported during the debrief that they were looking to see if the other person had kept the agreement in this instance, because if they had kept it, they would not have broken the agreement, even if perhaps on other occasions they might have done. These participants felt that they could



	Self-Record-Card	Self-Diary	Self-Other-Diary	Other-Other-Diary
Joy	0.4	0.28	0.09	-0.1
Anxious	0.1	-0.09	0	-0.1
Low-Mixed	-0.1	0.09	-0.18	-0.4

Figure 30. Interaction between *group* and intended *emotion-as-content* for confirmation indices (p = .027).

discount any occasions on which the agreement might not *strictly* have been kept, if they found evidence that the other person kept the agreement when they could.

Looking only at the diary data, as the card array presentation format is the same in those conditions, there is a trend away from falsification as we move from looking at one's own diary, to looking at the diary of a friend, to then looking at the diary of an unknown other. The response in these card array format conditions, to content intended to evoke joy, anxiety or a lower mixed emotion or neutral state, seems to be similar in that falsification indices tend to be highest in response to joyful content and lowest in response to neutral *emotion-as-content* conditions. Some participants in the *other-diary* conditions (*self-other-diary*, and *other-other-diary*) reported that they would not want to look at the diary of another person; they would feel awkward, and anxious about looking at the diary, and then guilty about having done so. A few participants in these conditions seemed to relish the opportunity to look through the diary of a friend, partner or colleague, or unknown person to see what they had written; the diary of a known person seemed to be more attractive than the diary of an unknown other. Planned, pairwise comparisons were conducted on falsification indices for the *self-self-diary* (imagine yourself in the situation described, and check through your own diary pages) and *other-other-diary* (the events happened to unknown others, and the diary was written by one of the people described in the scenario), groups. There were significant differences between these two groups in the joy *emotion-as-content* [F (1, 28) = 9.16, p = .004] and lower-mixed-neutral *emotion-as-content* [F (1, 28) = 3.30, p = .03] conditions.

7.4. Discussion

Without a measure of participants' emotional state when they started or completed the selection task, it is difficult to interpret the emotion data with confidence. This study was exploratory, and conducted to investigate whether the alterations in design features that were suggested by Manktelow, would result in the facilitation that he argued should be achieved in the new task. The facilitation effect was not observed in this data. The lack of this effect is not surprising. The social relationships that were present in the first study, are present in this study

also. The agreements have been extended to run across a short period of time, but they are otherwise unchanged. Participants in this study, like those in study one, seemed to understand the task. They talked about looking at *p* to see if they could find evidence that the other person had not broken the agreement on the other side of that page; they understood the relevance of the pages to the task. Participants also talked about not wanting to look at the diary of another person, particularly that of a friend, partner or colleague, because it *felt wrong* to do that. These participants, as were those in study one, were thinking about how to *act* in the situations that were presented to them in this task, and what the consequences of their actions might be. A few participants (*N* = 3), however, seemed very excited by the prospect of looking through the diary pages of another person, particularly if they knew that person. These participants seemed to have no concerns about the rightness of looking at another person's diary. Feeling labels should have been collected in this study, to allow a more thorough analysis of participant responses within this selection task.

Before conducting this study, the self-diary condition was almost withdrawn; it seemed odd that you might check within your own diary to see whether another person had broken an agreement. Participants, however, seemed to find nothing odd in the act of looking through their own diary to see what had happened in the scenarios, and most participants preferred this than looking in the diary of another. Participants offered spontaneous accounts of forgetting what had happened on different occasions when they had been out, and of looking through pictures or messages to see what had happened on those occasions; looking through their own diary seemed to be regarded as being equivalent to this.

As they had in study one (when in a happy *within-person* state), participants in this study reported that they were looking to see if the other person had *kept* the agreement, in response to happy *emotion-as-content*. In this study, as in study one, participants were asked which cards or diary pages they needed to turn over to see *whether or not* their friend, partner or colleague had *broken* their agreement. These have been labelled as being 'weak violation' instructions in this research programme; the emphasis is placed upon checking for violation rather than adherence, but this is

softened by including *whether or not*. In this study, participants reported that if they could find evidence that the other person had kept the agreement, on occasions on which that was uncertain (as it was in *p*), then the other person would have not broken their agreement. If they could find this evidence, participants seemed happy to discount instances that might be viewed as being occasions on which the other person had broken their agreement, because they might then not have been able to – something else might have happened.

Here it seems that participants were imagining possible mitigating circumstances, that might explain or excuse the behaviour of the other party on occasions when they might have, strictly speaking, not kept the agreement. According to participants in this and the first study, if the other person had kept the agreement once, then they would not have broken it. In the relationships portrayed in these scenarios, participants seemed motivated to protect these relationships in their choice of cards (or diary pages). They seemed to be bringing everyday realistic concerns into these selection tasks, and drawing upon their representations of these relationships when deciding how to act in these tasks. It seems entirely reasonable to allow a friend, partner or colleague the benefit of the doubt; before interpreting behaviour that *seems* superficially to represent a violation of contract as *being* a violation of contract, participants in this task are drawing upon their experience of life to suggest that the other person may have had good reason not to do as agreed on this occasion. To interpret such behaviour as being a breach of contract, and not excuse or discount it on such occasions, would be a rather odd way to behave towards a friend, partner or colleague against whom one had no good reason to want to find evidence of rule breaking. In interpreting *not-q* as clear evidence of rule-breaking, you might be mistaken. The act of interpreting the behaviour of a friend, partner or colleague in this manner, whether you were correct or not, could have costly consequences.

Within this study, as in study one, there was no reason to distrust the motives, good faith or intentions, or behaviour of the other party, and participants were reluctant to act in a way that suggested they did not trust the other party, or that seemed wrong. Within the relationships presented in these tasks, participants had

good reasons not to find evidence of rule breaking by the other party; there were benefits associated with finding evidence of rule adherence, and potential costs associated with finding evidence that friends, partners or colleagues had not done as agreed on one occasion. This behaviour is rational in de Sousa's (2008) account of how emotions can shape behaviour within relationships (see also, e.g., Elster, 2009; Sen, 2009). If the other party were an enemy, or someone whom you have been waiting for a chance to avenge, or someone whom you simply disliked, you might be eager to turn over the *not-q* card, and to expose their failure to do as they had promised. You might also be happy or willing to accept any possible costs associated with doing that; you would have no good relationship to be damaged with those parties in such instances, but your behaving in this manner might damage you if that behaviour was viewed negatively by others with whom you were in important relationships (employers, work colleagues, friends, partners, for example).

In study one participants who were in a happy emotional background state, selected the *q* card when in a happy *emotion-as-content* condition to prove that the other person kept their agreement. When these participants were in an anxious content condition, in which a degree of unease was introduced, they selected more *p* cards to see whether the other party might have *kept* their agreement on an occasion that presented them with uncertainty about how the other party had behaved (and some *not-q* cards). When anxious participants in study one encountered happy content, they selected more *p* cards in the hope that the other party would have kept rather than broken their agreement in this instance. The outcome that is associated with selection of *p* is uncertain; until that page or card is turned over, what the other party did on this occasion is unknown. This card therefore provides the opportunity to see what they did without prior knowledge of how they acted in this instance. The *q* card informs you that the other party conformed to the agreement, you can see that their behaviour conforms to the agreement in this instance *if* the other side of this page contains *p*. The *not-q* card also informs you how the other person behaved on a particular occasion, and you can see on this card that the other party broke the agreement (without turning it

over) if the other side of the page or card contains *p*. The *p* card is the card that seems to offer participants a fair way of finding out what the other person did in response to to *p*, without prior knowledge of their actions, when they feel uncertain; when participants *feel uncertain* about how the other person might behave, and want to leave room for discovery that the other party either kept *or* broke the agreement, participants seem to select the *p* card.

The behaviour of participants in the other-other-diary condition is difficult to explain, without a measure of background emotional state or their responses to different elements of the selection tasks. Their behaviour in confirmation indices and falsification indices was very similar to the behaviour of participants in the self-other diary. What was intended to distinguish these two groups was their immersion in the selection task narrative. In the *self* condition, participants were asked to imagine themselves within the situations described. In the *other* condition, participants were told that the events were describing the experiences of friends, partners or colleagues. Again, without a measure of emotional response to the selection task materials, or emotion as content, it is difficult to determine what was driving their behaviour. It seems possible that participants in the other-other-diary condition felt sympathy for the characters portrayed within the scenarios (as when watching a film, or reading a book), and felt *anxious-for* and *happy-for* them. The emotional responses might have been similar in both groups.

7.5. Including Answer Veracity Directions within Selection Task Instructions

After this study was completed, it seemed possible that card selection frequencies might have been affected by a feature of the selection tasks instructions: there was no comment within participant instructions about whether there was a correct way to respond within the selection task. Manktelow suggested that the inclusion of a passage that informed participants that there was no correct way to respond to the task, might help to disambiguate the task; if I was attempting to understand how participants might reason and behave in everyday decision settings, then I should tell them that this is what I was doing. He suspected that this addition to the

instructions, and clarification of the task, might produce a facilitation effect. The above study was therefore repeated, with the addition of an 'answer veracity' passage at the start of the selection task instructions in all conditions; this is presented below.

> There are NO right or wrong answers to the following questions, and it is vital that you respond to each of the situations that you will be presented with in the way that you would respond to such situations normally. Please don't think of this session as some kind of test – it isn't.

The addition of this passage within the task instructions, affected no change in participant card selection patterns. The above results were replicated in this repeat study. This replication suggests that the above results were not the result of participant failure to understand the task, or participant confusion about what they were supposed to be doing in this selection task. As instructed, participants were thinking about how they might act within the situation presented to them within and beyond the selection task.

7.6. Summary

The study that has been presented in this chapter was conducted to investigate whether flaws in the design of the first selection task study that was presented in chapter six, had led to a lack of the facilitation effect; Manktelow had suggested that the absence of this effect posed a major problem for the new task. The lack of a facilitation effect, he argued, suggested that there were flaws in the task design, or that participants had not understood the task because of the way in which it had been presented to them. Changes were made that might remedy potential flaws in the design or presentation of the task: extension of the conditional and card array across time, replacement of the record cards with diary pages so that the task might seem more realistic, and the addition of a third party who was checking for evidence of rule violation. A second selection task study, that included these adjustments was conducted to investigate whether these alterations would evoke a facilitation effect. This study, and an analysis and discussion of the data obtained

from it, has been presented in this chapter. No facilitation effect was obtained within this study. However, this changes to these factors did alter selection patterns in the new task, and these factors interacted with the *emotion-as-content* condition. What these changes evoked were, in effect, additional context effects. What has been demonstrated here is that changes to these features can influence reasoning and choice. These were not artefacts. Evidence has been presented in this chapter that participants were reasoning in this task, that they understood the task, and that their behaviour was a thoughtful response to the decision context that was presented to them in this task. They had good reasons for not looking for evidence of rule breaking in this study. The idea of checking another person's diary for evidence of rule-breaking was not something that most participants wished to do.

Chapter Eight. The Fourth Selection Task

Two studies have been presented in this chapter; they are both responses to the failure to obtain a facilitation effect within the first three studies with the selection task. Following the third study, Manktelow argued that participants might not understand that they were *supposed* to be looking for evidence of rule violation rather than rule adherence in this new task. Several rule violation instructions were therefore developed, which were designed to cue different degrees of rule violation expectation in task participants. These instructions were assessed in the first study that has been presented in this chapter, to determine whether they might lead participants to expect rule violation by the other party if they were used within the selection task. In the second study that has been presented herein, all versions of these task instructions were used in a fourth investigation with the selection task. The results of this study have been analyzed and discussed below.

8.1. Introduction

Three selection tasks had now been conducted, and in none of these had the facilitation effect been observed. Arguments to suggest why this might not have been expected or observed within these three studies, have been considered in the earlier chapters. Nevertheless, Manktelow (personal communication, December 2008), felt that observation of the facilitation effect was required in studies with the selection task to achieve publication; it seemed to be required at that time. The lack of a facilitation effect in the last three studies was therefore seen as being a problem that required a solution. The task instructions, again, became a focus. Manktelow now argued that it was perhaps not clear to participants in the previous three tasks, that they were supposed to be looking for evidence of rule violation in this task. He argued that some way was needed, to make it clear to participants that they were supposed to be selecting the cards that would show evidence of rule violation in this task. If this could be achieved, Manktelow felt that a facilitation effect might be observed within the data obtained from this new version of the selection task.

Weak rule violation instructions had been used intentionally within the first three selection tasks, to leave room for the effects of emotion on information representation and processing. Use of the cheater detection paradigm, which had been shown to achieve the facilitation effect, had been avoided in this research programme thus far. Telling participants that they should expect a given person to break their agreement, and then asking them to select the cards that would show that this person had broken their agreement, does not seem to provide much room for understanding how participants might behave in this kind of decision context in their everyday lives. To then discount or dismiss or criticise the behaviour of participants who have not done as they have been explicitly directed within the task, which is what seems to have happened in the cheater detection paradigm, does not help us understand how participants behave in a realistic decision context when they think about how to act. Neither does that approach help us to understand what factors are considered, or what goals are being pursued when participants think about the consequences of different behaviours. And yet, this, broadly, seems to have been the approach to the selection task that has been adopted within the cheater detection paradigm. Attempting to understand what participants *are doing* in this task, seems to offer a better way of advancing our understanding and modelling of human reasoning, decision making and associated behaviour (e.g., Evans & Ball, 2010).

There was evidence in the previous three studies that participants were looking for evidence of rule adherence rather than rule violation, as a way of determining that the other party had not then broken their agreement. These participants seemed to understand the task well. Their behaviour might not have conformed to the standards of deductive logic, or normative models of what constitutes 'good' task performance, but many participants seemed to be pursuing important practical goals within their approach to this task. However, it is possible that some participants had not understood that they were supposed to be looking for evidence of rule violation in the previous three studies. There is no way to prove that all participants understood the task in the previous studies, or that some participants had not understood the instructions. So, a way of addressing this possibility within the task instructions was investigated in the following two studies

that are reported here. In the first of these studies, seven rule-violation expectation instructions are rated by participants, to determine whether these instructions lead the participants to expect rule adherence or violation by the other party within the conditional agreements that are contained within the new selection tasks. In the second study reported below, these instructions are used within the selection task, to explore what effects they have on card selection frequencies within those tasks. The same selection task materials that were used in studies one to three were used here, and so the same relationships that participants thought about in those studies were presented to participants in the following two studies that are reported here.

The purpose of the following two studies was thus to adjust participant instructions, and to explore whether heightening the emphasis on checking for rule violation might increase participant selection of the *p* and *not-q* cards, and decrease selection of the *not-p* and *q* cards.

8.2. Study Four: Rule Violation Expectation Instructions

8.2.1. Method

8.2.1.1. Participants

Twenty postgraduate students (male $N = 10$, age $M = 22$, $SD = 1.26$, female, $N = 10$, age $M = 21.83$, $SD = 0.75$), who were recruited via opportunity sample from the Institute of Psychological Sciences at the University of Leeds participated in the rule-violation rating task. None of these participants had participated in any of the previous selection task studies, and none of these participants had had been enrolled on reasoning or decision-making modules.

8.2.1.2. Materials

Rule-Violation: Cuing of Expectation Strength within Instructions

The selection task instructions that were used in study two were adapted for use in this study. The conditional rule and card array were extended across time, as they had been in study two. The card array was presented as diary pages, and the diary was kept by the person whose perspective was presented within the scenarios

(these were the instructions used in the *self-self* condition in study two). Within these instructions, six rule-violation expectation cuing conditions were constructed, in which six different rule-violation expectation strengths were presented. These were intended to range from *weak* to *very strong* (*weak*, *weak-moderate*, *moderate*, *moderate-strong*, *strong*, *very-strong*). The weakest rule-violation expectation version was not intended to cue expectation of rule violation by the other party within the selection task. The strongest rule-violation expectation condition was expected to lead participants to expect rule violation by the other party in the selection task. The task instructions that were used in study one were also rated in this study, to provide a measure of how participants might have interpreted those instructions in the first selection task.

In the weak rule violation expectation cuing condition, the following directions were inserted within the selection task instructions (see Appendix 14, for full task instructions). These instructions were almost identical to those that had been used in study two in the *self-self* condition, except the words *or not* were removed to create the weak instruction version.

> Your task is to decide, for each scenario, which page(s) would need to be turned over (*which bits of information you would need to read or check*) to find out whether your friend/ partner / colleague broke the ground rule that you agreed to within the situation described.

In the *weak-moderate* condition, the following sentence was added to the start of this paragraph, and *or not* was reinserted.

> You're not sure if your friend/ partner/ colleague will keep to your agreement in each of the following situations. Your task is to decide, for each scenario, which page(s) would need to be turned over (*which bits of information you would need to read or check*) to find out whether or not your friend/ partner / colleague broke the ground rule that you agreed to within the situation described.

In the *moderate* rule-violation expectation cuing condition, *or not* was removed from the paragraph, as it had been in the weak rule-violation expectation condition. In all of the following conditions, *or not* was absent from the task instructions to remove the room for interpretation that this might allow. In the *moderate-strong*

rule-violation expectation cuing condition, the opening sentence was replaced with the following:

> You're not confident that your friend/ partner/ colleague will keep to your agreement (keep their side of the bargain) in each of the following situations.

In the *strong* rule-violation expectation cuing condition, this opening sentence was replaced with the following:

> You don't think that your friend/partner/ colleague will keep to your agreement in each of the following situations: they've often left you down in the past.

In the very-strong rule violation expectation cuing condition, this opening sentence to the paragraph was replace with the following:

> You have good reasons to distrust your friend/ partner/ colleague in each of the following situations and you feel sure that they will break your agreement; they've often let you down in the past when they've agreed to similar ground rules and then not done what they said they would.

Rating Dimensions

Within this rating task, three questions were asked to provide a measure of the degree to which the different instructions might lead participants to expect the other party to keep or break the agreement that are set out within the new selection tasks. In the first question, participants were asked whether the instructions led them to think that the friend, partner or colleague referred to would *keep*, or would *break* their agreement. Three answer options were provided for this question: no expectation (0), they would keep the agreement (-1), they would break the agreement (1). Answers to this question were assigned scores that ranged from -1 to 1. The second question asked participants whether the instructions directed them to check to see whether the friend, partner or colleague *kept*, or *broke* their agreement. Two answers were provided for this question: kept, which was assigned a score of -1, or broke, which was assigned a score of 1. The third task given to participants in this study, was to rate the instructions according to how weakly or strongly they focused on checking to see whether the friend, partner, or colleague kept or broke their agreement: this was measured on a 100mm line scale, with *neutral* positioned at the mid-point, marks left of the mid-

point indicated they focused on ‘kept the agreement’, and marks to right of the mid-point indicating that they focused on ‘broke the agreement’. The line was anchored with adjectives at three points to the right and left of the mid-point (*weakly*, *moderately*, *strongly*): -50 indicated that they focused strongly on *kept*, and 50 indicated that they focused strongly on *broke*.

8.2.1.3. Design

A one-way *within-subjects* design was utilized for the present study: rule-violation expectation was operationalized at seven levels (*original*, *weak*, *weak-moderate*, *moderate*, *moderate-strong*, *strong*, *very-strong*). The three measures obtained in the rating task were each treated as dependent variables: cued expectation of rule adherence or violation, expectation intensity, and task direction. The order in which rule-violation instruction conditions were presented within the task, was counterbalanced across participants.

8.2.1.4. Ethics

Ethical clearance for this study was obtained via the self-certification scheme from the Institute of Psychological Sciences Ethics Committee at the University of Leeds (Reference No. 08329-01). The design and conduct of this study adhered to the British Psychological Society’s (BPS, 2014) code ethics for research with humans.

8.2.1.5. Procedure

This study was conducted within the study areas of the Edward Boyle Library, at the University of Leeds. Participants were recruited opportunistically, within the study areas of this library (see Appendix 15 for participant information sheet). After completing participant consent forms, participants read through task instructions to ensure comprehension before starting the rating task. Participants then rated each of the seven instruction task versions on the three judgement dimensions; participants read each of the instruction versions, and then rated it on the three dimensions, before moving on to the next instruction version and rating that one. All tasks were presented and completed in paper and pen format. Participants

completed the rating task separately and were debriefed at the end of this task. Time for task completion was approximately thirty minutes.

8.2.2. Results

To assess whether there were any differences between task instruction conditions within the three rule-violation elements that were assessed in the rating task, the three dependent variables were analyzed using a multivariate ANOVA. Task instruction condition (*original*, *weak*, *weak-moderate*, *moderate*, *moderate-strong*, *strong*, *very-strong*) was treated as a *within-subjects* grouping factor, and the three rule-violation measures were entered as dependent variables. The results of this analysis are reported below, by dependent variables.

Task Direction

The task direction rating provided a measure of whether the instructions directed participants to check to see whether the friend, partner or colleague *kept* or *broke* their agreement. Scores on this dimension were either -1, for instructions that directed participants to check to see whether this person kept the agreement, or 1, for instructions that directed participants to check to see whether they had broken the agreement. No effect of task instruction condition on task direction was observed ($F < 1$). Frequencies for task directions (kept *vs*. broke) are reported in Table 23. As can be seen from the data in this table, most participants reported that task instructions in all of the tested rule-violation conditions were directing them to check to see whether the friend, partner or colleague *broke* the rule in the selection task. In the two instruction conditions that contained the words '*or not*', three out the twenty participants felt that the instructions were directing them to check to see whether this person *kept* the ground rule. In the *weak*, *moderate* and *moderate-strong* instruction conditions, two participants out of the twenty felt that the instructions were directing them to check to see whether this party had *kept* the agreement. In the *very-strong* rule violation expectation condition, one participant out of the twenty felt that the instructions were directing them to check to see whether this party had *kept* the agreement.

Table 23. Frequencies of kept and broke ratings by rule-violation instruction rating condition (*N* = 20).

	Task Direction	
Rule Violation Condition	Kept	Broke
Original-Study 1	3	17
Weak	2	18
Weak-Moderate	3	17
Moderate	2	18
Moderate-Strong	2	18
Strong	0	20
Very-Strong	1	19

Key: Different participants made the kept rating between instruction conditions

Cued Expectation of Rule Adherence or Rule Violation

The expectation of rule adherence or rule violation rating provided a measure of whether the instructions led participants to think that the friend, partner or colleague referred to in the scenario would keep or break their agreement. Scores on this dimension ranged from -1, for instructions that led participants to think that they would *keep* their agreement, to 0 for instructions that created no expectation about whether this party would keep or break the agreement, and 1 for instructions that led participants to think that this person would *break* their agreement. Frequencies for keep, no expectation and break are reported in Table 24. One participant of the twenty reported, in the *original study one* instructions, the *moderate-strong* rule violation instructions, and the *strong* violation instructions, that the instructions led them to think that the other party would *keep* the ground rule that was presented in the selection task. Most participants felt that no expectation of rule-breaking or adherence were created by the instructions presented in the study one instructions, weak, weak-moderate, and moderate rule violation expectation conditions. Most participants also reported that the instructions presented in the *moderate-strong*, *strong* and *very-strong* rule-violation expectation conditions led them to expect that the other party would *break* their agreement.

Table 24. Frequencies of keep, no expectation and break ratings by rule-violation instruction condition (*N* = 20).

	Expectation		
Rule Violation Condition	Keep	None	Break
Original-Study 1	1	11	8
Weak	0	12	8
Weak-Moderate	0	14	6
Moderate	0	14	6
Moderate-Strong	1	2	17
Strong	1	0	19
Very-Strong	0	0	20

Key: Different participants were making the keep rating between instruction conditions

A main effect of rule-violation instruction condition was observed for cued expectation of rule violation [$F_{(6,133)} = 8.78$, $p < .001$]. Post hoc Bonferroni pairwise comparisons revealed significant differences between eleven instruction conditions. Significant differences between pairwise comparison groups are reported in Table 25.

Table 25. Significant pairwise comparisons by rule-violation instruction condition (*N* = 20).

Rule Violation Instructions		*M Diff*	*SE*	*p* value
Moderate-Strong	Original-Study 1	0.45	0.15	$p = .005$
	Weak-Moderate	0.50	0.15	$p = .049$
	Moderate	0.50	0.15	$p = .045$
Strong	Original-Study 1	0.55	0.15	$p = .006$
	Weak	0.50	0.15	$p = .019$
	Weak-Moderate	0.60	0.15	$p = .002$
	Moderate	0.60	0.15	$p = .002$
Very-Strong	Original-Study 1	0.65	0.15	$p < .001$
	Weak	0.60	0.15	$p = .002$
	Weak-Moderate	0.70	0.15	$p < .001$
	Moderate	0.70	0.15	$p < .001$

These significant differences echo the frequency patterns that are discussed above. The instruction conditions fall into two groups. The *moderate-strong*, *strong* and *very-strong* conditions achieved significantly different cued expectation scores than did the *original*, *weak*, *weak-moderate* and *moderate* instruction conditions. Most participants felt that the stronger group created the expectation that the other party would break the ground rule. Although approximately thirty to forty percent of participants felt that the weaker instruction conditions created an expectation that the other party would break the ground rule, approximately sixty percent of participants felt that they created no expectation that the other party would either keep or break the ground rule.

Expectation Intensity

The expectation intensity rating provided a measure of how weakly or strongly the task instructions focused *either* on checking to see whether the other party in the selection task *kept* or *broke* their agreement. The scale used for this variable ranged from -50 (very strongly focused upon checking to see whether the other party *kept* the agreement) to 50 (very strongly focused on checking to see whether the other party *broke* the agreement. Descriptive statistics for this outcome measure are reported in Table 26. As can be seen from this table, participant estimates of how strongly the instructions in each of the different conditions focused on rule adherence or rule violation, varied between participants. There appears to be a trend within the data, for expectation intensity to increase as the intended strength of cued expectation of rule violation increases within the instruction conditions.

Table 26. Descriptive statistics for expectation intensity by rule-violation instruction condition (*N* = 20)

Rule Violation Condition	*M*	*SD*
Original-Study 1	21.85	19.62
Weak	21.90	20.01
Weak-Moderate	15.05	19.33
Moderate	19.30	18.13
Moderate-Strong	27.05	21.27
Strong	41.20	9.51
Very-Strong	43.40	19.06

A main effect of instruction condition was observed for expectation intensity scores [$F_{(6,133)} = 7.069$, $p < .001$]. Post hoc Bonferroni pairwise comparisons revealed significant differences between the *strong* and *very-strong* instruction conditions, and all other instruction levels except the *moderate-strong* condition. Significant differences between pairwise comparison groups are reported in Table 27.

Table 27. Significant pairwise comparisons by rule-violation instruction condition for expectation intensity ($N = 20$)

Rule Violation Instructions		*M Diff*	*SE*	*p* value
Strong	Original-Study 1	19.35	5.85	$p = .025$
	Weak	19.30	5.85	$p = .026$
	Weak-Moderate	26.15	5.85	$p < .001$
	Moderate	21.90	5.85	$p = .006$
Very-Strong	Original-Study 1	21.55	5.85	$p = .007$
	Weak	21.50	5.85	$p = .007$
	Weak-Moderate	28.35	5.85	$p < .001$
	Moderate	24.10	5.85	$p = .001$

The very strong and strong instruction conditions created a significantly greater expectation that the 'other' party referenced in the ground rule would break their agreement. The *weak* instruction condition that was created for this study, created the weakest expectation about the other party would break the ground rule.

8.2.3. Discussion

This rating task was conducted to investigate whether the task instructions that had been used in studies one to three, might have created an expectation in participants about whether the other party would keep or break their agreement. Furthermore, it was used to investigate whether participants understood that they were being asked to look for evidence that the other party had broken the agreement within the selection task instructions. In order to heighten expectation of rule violation by the other party in the next selection task, several new instructions were created that were intended to lead participants to expect that the

other party *would* break the agreement that they made in the selection task scenarios. The ratings provided within this task, provided a way of testing these instructions to see whether they might have this effect within the next selection task.

Task Direction

The task direction data obtained in this study indicates that most participants understood that they were being asked to look at the behaviour presented in the card array and select evidence that will tell them whether the other person broke their agreement. In the two conditions that contained the '*or not*' addition (i.e., check *whether or not* they had broken the agreement), fifteen percent of participants felt that the instructions were directing them to check to see whether the 'other' party kept the agreement. The inclusion of this element within the instructions perhaps does then provide a small degree of ambiguity, which was intended to allow room for the influence of emotion on reasoning, decision making and behaviour in this research programme. With *or not* removed from the instructions, ten percent of participants felt that the *weak*, *weak-moderate* and *moderate-strong* instruction conditions were directing them to look for evidence that the other party kept the agreement. Even more surprising, one participant (five percent), felt that the *very-strong* instructions, which informed them that they had good reasons to distrust this person, because they have let them down in the past and they now feel sure that this other person will break this agreement (which pages do you need to turn over to see whether they broke this agreement), felt that the instructions were asking them to check to see whether the other person kept the agreement. Perhaps this is an effect of emotion, which was observed in studies one to three, in which participants felt that if they found evidence that the other party had kept the agreement, then they would not have broken it. However, there is no evidence to support this, or to suggest why these participants interpreted the instructions in this manner. The ratings of this dimension, however, suggest that participants in studies one to three were likely to have understood that they were being asked to check for evidence of rule violation.

Cued Expectation of Rule Violation or Adherence

The cued expectation ratings of the task instruction conditions also suggest that the instructions used in the first three studies would not have created an expectation that the other party would keep their agreement. Most participants reported that the instructions used in these studies, created *either* no expectation of whether the other would break their agreement, or an expectation that they *would* break the agreement. The instructions used in study one had been designed to be weak rule-violation instructions, and they seemed to largely function in this manner in this rating task. The instruction conditions that were created for use in the next selection task, in which rule violation by the other party was increasing cued, seemed to function as intended. The *weak*, and *weak-moderate* and *moderate* instruction conditions functioned as the original instructions had, as discussed above. The *moderate-strong*, *strong* and *very-strong* instructions led participants to expect that the other party would break their agreement.

Expectation Intensity

Expectation intensity is perhaps hard to anchor on the scales that were used in this task. However, the ratings provide a measure that allows us to compare the instruction conditions that were assessed in this study on this dimension. The expectation intensity scores, when added to the cued expectation data discussed above, provide evidence that the instructions that have been developed for the fourth selection task should function as intended. Participant expectation that the other party would break the agreement increased across the cued expectation of rule violation instruction conditions. The highest expectation that the other party would break their agreement, was evoked by the *very-strong* instruction condition. Participants thus perhaps became more certain in this condition that the other person would break their agreement; the expected probability of their doing so was highest in this condition.

8.3. The Fourth Selection Task

The rating task reported above, provided validation of the instruction conditions that would be used in this fourth selection task study, which is again exploratory, and a response to the criticisms of Manktelow that have been discussed above. The purpose of the study that is reported in this section, was to increase participant expectation that the other party would break their agreement within the selection task, increase emphasis on checking for evidence of their agreement violation, and explore whether these changes to the task instructions would increase participant selection of the *p* and *not-q* cards, and decrease selection of the *not-p* and *q* cards. The purpose of investigating this question, was to determine whether this shift of emphasis within the instructions would produce the 'desired' facilitation effect. As the same selection task materials that had been used in study two and three would be used in this study, in which the same relationships existed between friends, partners or colleagues, it seemed unlikely that a facilitation effect would be observed in every instruction condition, given participant accounts of their behaviour in the first three selection tasks. Given the strong direction within the two most intense rule-violation expectation instruction conditions, it seemed possible that more participants would select *p* and *not-q* cards in those conditions.

Whilst conducting this additional study, the opportunity was taken to include the *self* and *other* conditions that had been included in the second and third selection task studies. The new selection tasks were designed to allow a test of perspective effects, and there seemed to be an effect of perspective in the previous two selection tasks. It seemed worth including these perspectives in this study, to explore whether an effect of the self and other perspectives would be observed again here. In the *self* condition, participants would be asked to imagine themselves in the situation described within the scenarios, and to imagine that they were experiencing the situation as it was described. This was the perspective from which the *emotion-as-content* conditions had been designed to evoke their intended effects (of joy, anxiety, or a lower-mixed-neutral state), to allow an investigation of what effects these emotions might have on reasoning, decision making, and card

selection behaviour. The other perspective condition that was included in this study, was the *other-other-diary* condition that was used in the second and third selection task studies. In this condition, participants were informed that the scenarios described the experience of one of two friends or colleagues, or partners. Participants were not asked to adopt a distanced perspective from the situations that were depicted within the selection task, but they were not asked to imagine that they were in the situations described. This was expected to result in participants adopting a more distanced position in this perspective condition. What the effect of this more distanced perspective might be is uncertain, However, participants in this condition might be expected to respond more straightforwardly to the increased expectation of rule violation that is cued in the instruction conditions. The reason for this being that they are not to imagine themselves as being personally involved with the characters portrayed within the selection tasks. In this condition, participants would select more *p* and *not-q* cards as the rule-violation expectation increases across instruction conditions. Whether participants in the *self* condition will do the same, is uncertain.

8.3.1. Method

8.3.1.1. Participants

One hundred and eighty undergraduate and postgraduate students (male $N = 90$, age $M = 20.88$, $SD = 2.66$, female $N = 90$, age $M = 20.05$, $SD = 1.44$) from the Schools of Law, Business, English, Mathematics, and Mechanical Engineering at the University of Leeds participated in this study. None of these participants had taken part in any of the previous studies conducted within this research programme, and none of these participants had had been enrolled on reasoning or decision-making modules.

8.3.1.2. Materials

Five *expectation of rule-violation* task instruction conditions were included in this study. These were the *weak*, *moderate*, *moderate-strong*, *strong*, and *very-strong*

versions that were tested in the rating task. To avoid any ambiguity in direction, *or not* was removed from the weak instruction version, and it was absent from all task instructions that were used in this study. The *weak-moderate* instruction condition was not included in this study, as this version was differentiated from the *moderate* version by inclusion of '*or not*'. In the weak condition, selection task instructions contained the following paragraph (see Appendix 17 for task instructions).

> *Weak* Your task is to decide, for each scenario, which page(s) would need to be turned over (*which bits of information you would need to read or check*) to find out whether your friend, partner or colleague broke the ground rule that you agreed to within the situation described.

In the remaining *expectation of rule violation* task instruction conditions, the following opening sections were added to the start of this paragraph.

Moderate	You're not sure if your friend, partner or colleague will keep to your agreement in each of the following situations.
Moderate-Strong	You're not confident that your friend, partner or colleague will keep to your agreement (keep their side of the bargain) in each of the following situations.
Strong	You don't think that your friend, partner or colleague will keep to your agreement in each of the following situations: they've often left you down in the past.
Very-Strong	You have good reasons to distrust your friend/ partner/ colleague in each of the following situations and you feel sure that they will break your agreement; they've often let you down in the past when they've agreed to similar ground rules and then not done what they said they would.

The *self* and *other* perspectives that were used in this study were the *self-diary* and other-other-diary conditions that were used in studies two and three. In the *self-diary* condition, participants were asked to imagine themselves in the situations described in the scenarios presented to them in the selection tasks, and that they were experiencing them as they were described. The card array was presented as pages from their own diary, which they were asked to check to see whether the other party broke the agreement in each of the situations described. Participants in the *other-other-diary* conditions were informed that they would be presented with

three different situations in which two friends, colleagues or partners came to an agreement. The diary pages were presented as being from the diary of the person whose experience was described within each of the scenarios. Apart from the alterations to expectation of rule-violation in the instructions that are set out above, no other changes were made to the selection task instructions that had been used in studies two and three; these were the instructions that were used here. The conditional agreement and card array behaviours were thus extended across time.

8.3.1.3. Design

A 2 perspective (*self*, *other*) by 3 *emotion-as-task-content* (*joy*, *anxiety*, *lower-mixed-neutral*) by 5 rule-violation expectation (*weak*, *moderate*, *moderate-strong*, *strong*, *very-strong*) design was utilized for this study. Perspective and rule-violation expectation cueing were operationalized *between-subjects*. *Emotion-as--content* was measured *within-subjects*. Participants were presented with one *emotion-as-content* version of three different selection task scenarios in this study; they therefore completed one *joy*, one *anxiogenic* and one *lower-mixed-neutral* version of the selection task in this study. These were taken from the same four scenarios that were used in studies two and three, in which the opening contexts and conditional agreements had been extended across time. Card selection frequencies (*p*, *not-p*, *q*, *not-q*) were used as the dependent variable. Intended *emotion-as-content* conditions from each of the scenarios were counterbalanced across participants to allow for a better measure of the influence of *emotion-as-content* on card selection frequencies. The presentation order of intended *emotion-as-content* conditions, and each of the scenarios, were counterbalanced across participants. The order in which card array items were presented in each of the selection tasks presented in this study were also counterbalanced across participants; six card array orders were used to achieve this. Participants were randomly allocated to perspective and rule-violation expectation instruction conditions using a random-numbers table.

8.2.1.4. Ethics

Ethical clearance for this study was obtained via the self-certification scheme from the Institute of Psychological Sciences Ethics Committee at the University of Leeds (Reference No. 08328-01). The design and conduct of this study adhered to the British Psychological Society's (BPS, 2014) code ethics for research with humans.

8.3.1.4. Procedure.

As before, this study was conducted within the study areas of the Edward Boyle Library at the University of Leeds. Participants were recruited opportunistically, within the study areas of this library. After completion of participation consent forms, participants were allocated to one of the following ten experimental conditions (*N* = 18 for each condition). Participants were allocated to either the *self* or *other* perspective condition, and participants in each perspective condition were allocated to *one* of the five rule- violation expectation instruction conditions (*self* or *other*, with *weak*, *moderate*, *moderate-strong*, *strong*, or *very-strong* instructions). All tasks were presented and completed in paper and pen format. Participants read through task instructions to ensure comprehension before starting the selection task. Participants then completed three versions of the selection task (1 x joy, 1 x anxiogenic, 1 x low- mixed-neutral), within in a single experimental session. Participants completed the task separately, and they were debriefed after they had completed the selection task. Time for task completion was approximately twenty minutes.

8.3.2. Results

8.3.2.1. Card Selection Analysis.

As they had been in the previous studies, card selection frequencies were assessed using confirmation and falsification Pollard indices (Pollard & Evans, 1987). No significant differences in Pollard indices were observed between any of the scenarios used in this study, and so the following analysis has been reported with card selection frequencies collapsed across scenarios.

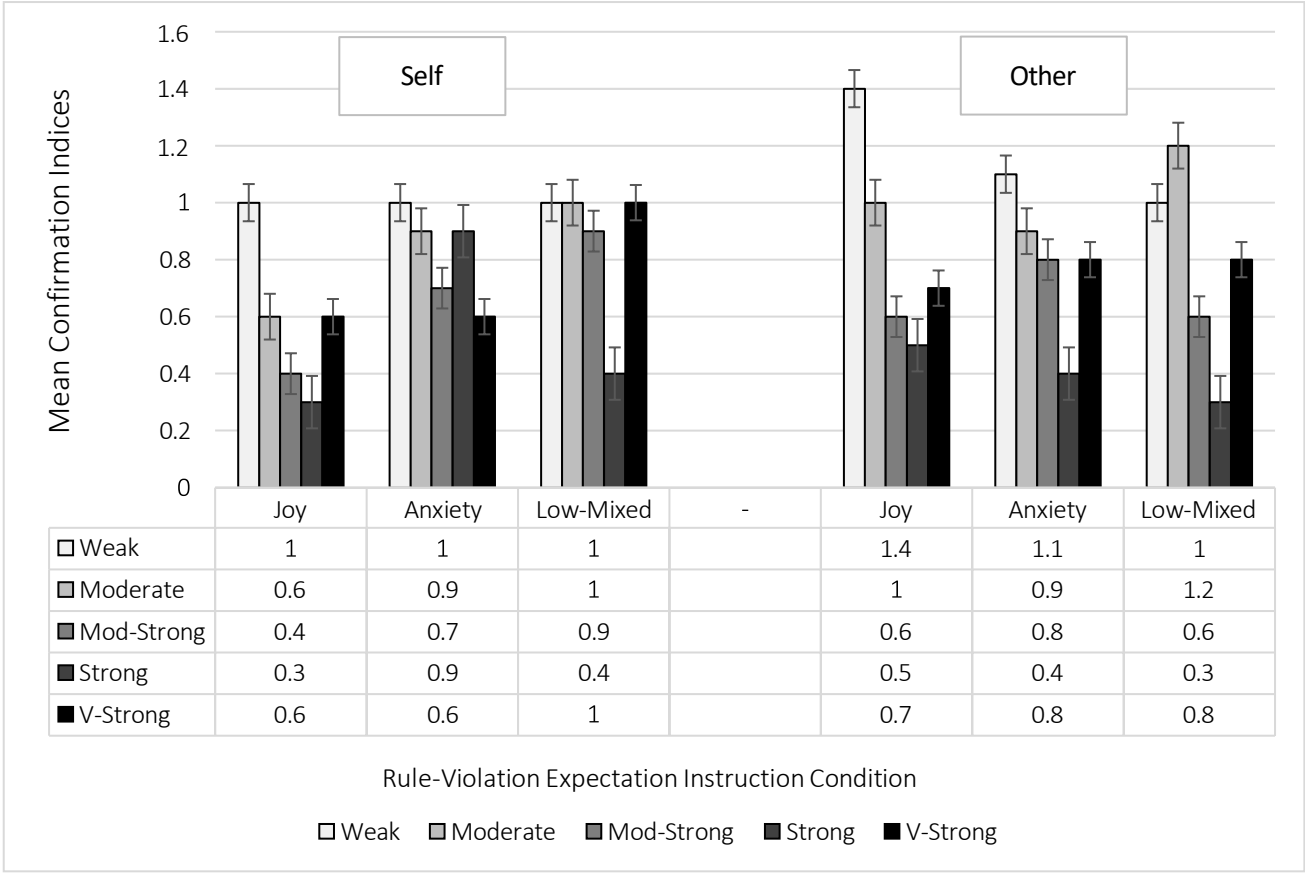
8.3.2.1.1. Confirmation Indices

To examine the confirmation indices obtained in this study, an omnibus test was conducted in which all three factors were entered into a repeated measures ANOVA, to investigate whether there were significant differences between the conditions. Emotion-as-content (*joy*, *anxiety*, *lower-mixed-neutral*) was entered as a *within-subjects* variable. Perspective (*self*, *other*) and rule-violation expectation instruction conditions (*weak*, *moderate*, *moderate-strong*, *strong*, *very-strong*) were entered as *between-subjects* factors. No main effects of perspective (self, other) or *emotion-as-content* (joy, anxious, lower-mixed-neutral) were observed (*F*s < 1). A main effect of rule-violation expectation strength was observed [$F_{(4, 170)} = 4.57$, $p = .002$]. Bonferroni post hoc comparisons showed significant differences between the *strong* and *weak*, and the *strong* and *moderate* rule-violation expectation conditions (see Table 28 for a statistical summary of these differences).

Table 28. Significant pairwise comparisons by rule-violation instruction condition

Rule Violation Instructions		*M Diff*	*SE*	*p* value
Weak	Strong	0.62	0.16	$p = .001$
Moderate	Strong	0.47	0.16	$p = .028$

Confirmation indices decreased as the strength of rule-violation expectation increased in participant instruction conditions; the stronger were the cues given to participants that the other party might or would break their agreement, the more frequently participants selected *p* and *not-q* cards. There was an exception to this pattern in the strongest rule-violation expectation condition; participants in this condition switched to look for evidence that the other person kept their agreement here. Participants reported spontaneously in the debrief session that they decided to look to see if they could find evidence that the other person had kept their agreement here, in case they were being unfair on them by assuming that they would again break their agreement. They decided to give them a chance, and so selected more *p* cards here. Participants also selected more *not-q* cards in this



	Joy	Anxiety	Low-Mixed	-	Joy	Anxiety	Low-Mixed
Weak	1	1	1		1.4	1.1	1
Moderate	0.6	0.9	1		1	0.9	1.2
Mod-Strong	0.4	0.7	0.9		0.6	0.8	0.6
Strong	0.3	0.9	0.4		0.5	0.4	0.3
V-Strong	0.6	0.6	1		0.7	0.8	0.8

Figure 31. Mean confirmation indices by *self* and *other, emotion-as-content* and *rule-violation expectation* instruction condition

strongest rule-violation expectation condition. This pattern across the instruction conditions was observed in all *emotion-as-content* conditions, and in both perspective conditions, as can be seen in Figure 31.

No three-way interaction was observed between *emotion-as-content*, perspective and rule-violation expectation instruction condition ($F < 1$). Neither was an interaction between *emotion-as-content* and instruction condition observed [$F(8, 170) = 1.34$, $p = .22$]. A significant interaction between *emotion-as-content* and perspective was observed for confirmation indices [$F(2, 340) = 4.47$, $p = .036$]; a graphical display of this can be seen in Figure 31. Significant differences were observed between *self* and *other* in *joy* [$F(9, 90) = 2.16$, $p = .027$], and *low-mixed-neutral* [$F(9, 90) = 2.02$, $p = .039$] *emotion-as-content* conditions. Overall, the pattern of confirmation indices is very similar for *self* and *other* in *joy* and *low-mixed-neutral emotion-as-content* conditions, across instruction conditions. However, confirmation indices are a little higher in response to content designed to evoke joy for participants in the *self* condition (*vs*. those in the *other* condition), and a little lower in response to content designed to evoke low-mixed or neutral emotions for participants in the *self* condition (vs. those in the *other* condition). Confirmation indices in the anxiogenic content condition, were very similar for both perspective groups.

Significant differences in confirmation indices were also observed between rule-violation instruction conditions, in the joy [$F(9, 90) = 3.85$, $p = .005$] and lower-mixed-neutral [$F(4, 90) = 4.02$, $p = .004$] *emotion-as-content* conditions, but not in the anxiogenic content conditions. In both self and other perspective groups, participant responses to the instruction conditions altered as described above, with confirmation indices decreasing as the rule-violation expectation increased (until the highest instruction level). This pattern was a little flatter in the self, anxiogenic condition, and responses in this group showed no strong tendency to check to see whether the other person had kept the agreement in response to anxious content in the strongest rule-violation expectation condition.

Confirmation Indices for Other and Self

The above analysis was repeated for self and other participants separately, to see whether their inclusion within the same analysis had biased results. A repeated measures ANOVA was conducted for *other* data, to investigate whether there were significant differences between the conditions with *self* excluded from the analysis. *Emotion-as-content* (*joy*, *anxiety*, *lower-mixed-neutral*) was entered as a *within-subjects* variable in this analysis, and rule-violation expectation instruction conditions (*weak*, *moderate*, *moderate-strong*, *strong*, *very-strong*) was entered as *between-subjects* factor. The above effects were observed for participants in the other condition. Exclusion of the *self* group did not alter the pattern or significance of results.

The above analysis was then conducted on data obtained from the *self* perspective condition, with the *other* condition excluded from results. A repeated measures ANOVA was conducted for *self* data, with *emotion-as-content* (*joy*, *anxiety*, *lower-mixed-neutral*) entered as a *within-subjects* variable in this analysis, and rule-violation expectation instruction conditions (*weak*, *moderate*, *moderate-strong*, *strong*, *very-strong*) entered as *between-subjects* factor. In this analysis, only one significant effect was observed. There was a main effect of *emotion-as-content* [F (2, 85) = 4.04, p = .047]. Paired-samples t-tests revealed significant differences between *joy* and *anxious* content conditions (t = -2.03, df = 89, p = .045, 2-tailed), and between *joy* and *lower-mixed-neutral* content conditions (t = -2.03, df = 89, p = 0.45, 2-tailed). Confirmation indices were significantly lower in response to joy content (M = .58, SD = 1.12, 978, SE = .11) than to they were in response to anxious (M = .82, SD = .98, SE = .09) and lower-mixed-neutral (M = .86, SD = .92, SE = .09) conditions.

8.3.2.1.2. Falsification Indices

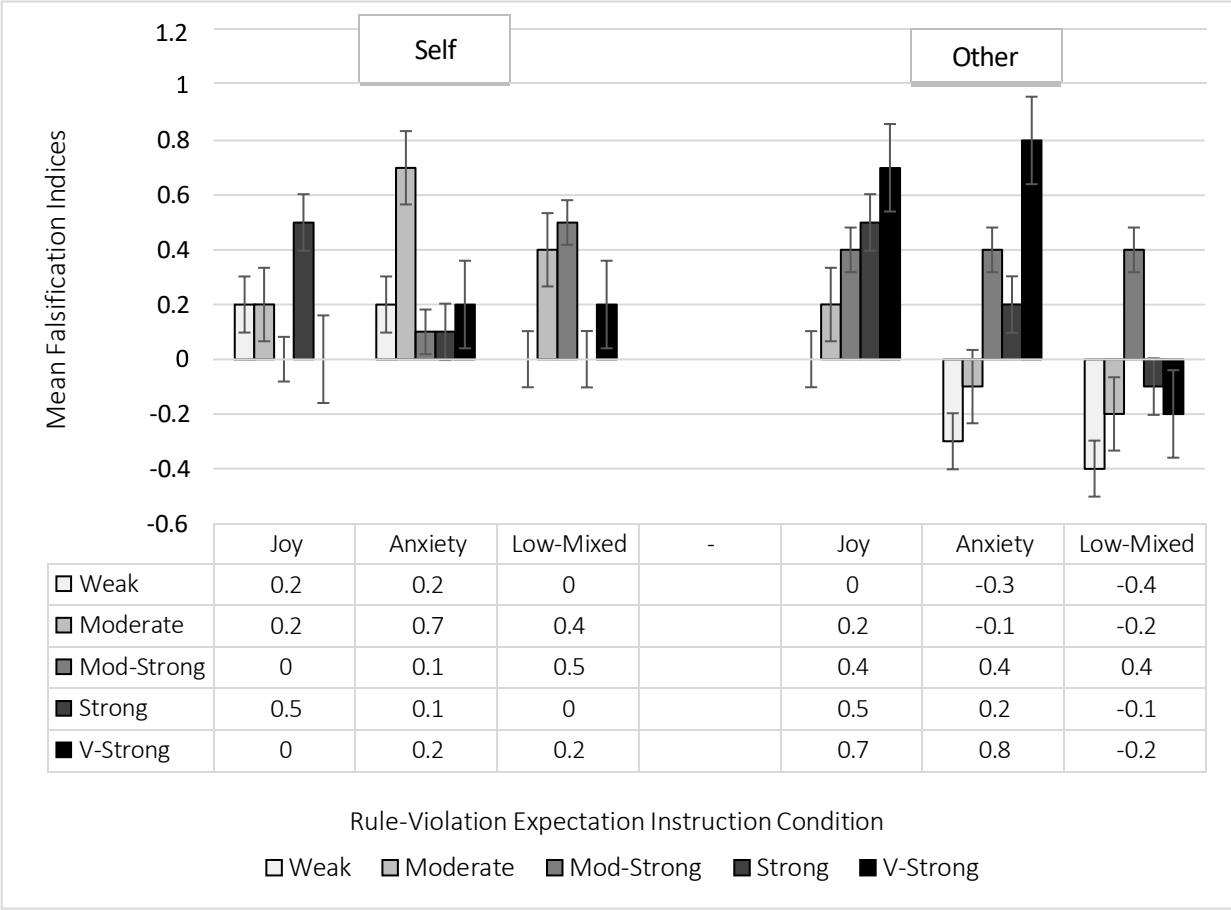
To examine falsification indices, an omnibus test was conducted in which all three factors were entered into a repeated measures ANOVA, to investigate whether there were significant differences between the conditions tested in this study.

Emotion-as-content (*joy*, *anxiety*, *lower-mixed-neutral*) was entered as a *within-subjects* variable in this analysis. Perspective (*self*, *other*) and rule-violation expectation instruction conditions (*weak*, *moderate*, *moderate-strong*, *strong*, *very-strong*) were entered as *between-subjects* factors. The results of this analysis are displayed in Figure 32. No main effects of perspective (*self*, *other*) or rule-violation instruction condition were observed (*F*s < 1). A main effect of *emotion-as-content* (joy, anxious, lower-mixed-neutral) was observed [$F_{(2, 170)} = 4.55$, $p = .011$]. Paired-samples *t*-tests were used to examine falsification indices for differences between emotion as content conditions: rule-violation expectation instruction condition and perspective groups were collapsed in this analysis. Descriptive statistics for pairwise comparisons are presented in Table 29.

Table 29. Descriptive statistics for falsification indices by *emotion-as-content* (*N* = 180)

Emotion-as-Content	*M*	*SD*	*SE*
Joy	.27	.91	0.64
Anxiogenic	.23	.93	0.66
Low-Mixed	.06	.92	*0.65*

Significant differences were observed between *joy* and *lower-mixed-neutral* ($t = 2.72$, $df = 179$, $p = .007$, 2-tailed), and *anxious* and *lower-mixed-neutral* ($t = 2.37$, $df = 179$, $p = .019$, 2-tailed) *emotion-as-content* conditions. Falsification indices were higher in joy and anxious conditions than they were for low-mixed-neutral content conditions. No three-way interaction between factors was observed in this data (*F* < 1). There were significant interactions between *emotion-as-content* and *perspective* [$F_{(2, 170)} = 5.723$, $p = .004$], between *emotion-as-content* and *rule-violation* instruction condition [$F_{(2, 170)} = 2.40$, $p = .015$], and between *rule-violation* instruction condition and perspective [$F_{(4, 170)} = 2.65$, $p = .003$].



	Joy	Anxiety	Low-Mixed	-	Joy	Anxiety	Low-Mixed
Weak	0.2	0.2	0		0	-0.3	-0.4
Moderate	0.2	0.7	0.4		0.2	-0.1	-0.2
Mod-Strong	0	0.1	0.5		0.4	0.4	0.4
Strong	0.5	0.1	0		0.5	0.2	-0.1
V-Strong	0	0.2	0.2		0.7	0.8	-0.2

Figure 32. Mean falsification indices by *self* and *other, emotion-as-content* and *rule-violation expectation* instruction condition

Emotion-as-Content by Perspective

Significant differences in falsification indices were observed between *self* and *other* participants in *anxious* [F (9, 90) = 2.79, p = .004] and *low-mixed-neutral* [F (9, 90) = 2.31, p = .018] *emotion-as-content* conditions. With data collapsed across rule-violation expectation instruction conditions, falsification indices were higher in response to anxiogenic content in *other* participants (*vs*. those in the *self* condition), but lower in the *low-mixed-neutral* content condition for *other* participants than they were for participants in the *self* condition.

Emotion-as-Content by Rule-Violation Expectation Instructions

The magnitude of falsification indices within the rule-violation expectation instruction conditions, differed between *emotion-as-content* conditions. The relative strength of falsification indices within instruction condition is displayed in Table 30, by *emotion-as-content* condition. As can be seen from Figure 32 above, the pattern of falsification indices obtained within these two conditions, differs between perspective conditions, and so these patterns are considered in greater detail below, by self and other.

Table 30. Mean falsification indices by *emotion-as-content* and rule-violation expectation instruction conditions (N = 180).

Joy		Anxious		Neutral	
Instruction	*FI*	Instruction	*FI*	Instruction	*FI*
Weak	.10	Weak	-.05	Weak	-.20
Moderate-Strong	.20	Strong	.15	Strong	-.05
Moderate	.20	Moderate-Strong	.25	Very-Strong	.00
Very-Strong	.35	Moderate	.30	Moderate	.10
Strong	.50	Very-Strong	.50	Moderate-Strong	.45
p	.28		.06		.09

In the *other* condition, falsification indices followed a similar overall pattern across rule-violation expectation instruction conditions in the *joy* and *anxious* content

conditions. Falsification indices were lowest in the weakest instruction condition, and highest in the strongest rule-violation expectation instruction condition. In the joy condition, falsification indices were above zero in all instruction conditions. In the anxiogenic condition, however, falsification indices dropped below zero in the two weakest rule-violation expectation instruction conditions, rose to equal the falsification indices observed in joy content conditions for the moderate instruction condition, and exceeded the falsification indices observed in response to joy content in the very-strong instruction condition. In the lower-mixed-neutral *emotion-as-content* condition, falsification indices were below zero in all but the moderate-strong instruction condition. Falsification indices obtained in the weak and moderate instruction conditions were very similar to those that had been observed for these conditions in the anxiogenic content condition. The systematic trends in falsification indices that were observed across rule-violation expectation instruction conditions, in the happy and anxious content conditions for *other* participants, were not observed in the data obtained from *self* participants. The data obtained from participants in the *self* condition was more messy.

In the other perspective condition, with *self* excluded from the analysis, there was a significant interaction between *emotion-as-content* and instruction condition [F (2, 170) = 2.43, p = .042]. In the *self* condition, however, with other excluded from analysis, the same significant interaction was observed, *between emotion-as-content* and instruction condition [F (8, 170) = 2.02, p = .045]. Although the pattern of data obtained from the *self* and *other* perspectives differed, the same interaction between these two variables was observed in both perspective conditions.

Other

When investigated separately, with the *self* perspective excluded from the analysis, main effects of *emotion-as-content* [F (2, 85) = 10.01, p < .001] and instruction condition [F (4, 85) = 3.50, p = .010] were observed within the *other* perspective condition for falsification indices. Falsification indices were significantly greater in *happy* (t = -4.75, df = 89, p < 0.01, 2-tailed) and *anxious* (t = 2.62, df = 89, p = 0.10, 2-tailed) content conditions, than they were in *lower-mixed-neutral* content

condition. The descriptive statistics for each of the *emotion-as-content* conditions are displayed in Table 31.

Table 31. Descriptive statistics for 'other' falsification indices by *emotion-as-content*

Emotion-as-Content	*M*	*SD*	*SE*
Joy	.36	.85	.08
Anxiogenic	.20	1.02	.10
Low-Mixed	-.10	.95	.09

Within the rule-violation expectation instruction conditions, Bonferroni post hoc comparisons revealed significant differences within the *other* data, between the *weak* and *moderate-strong*, and the *weak* and *very-strong* instruction conditions (statistics for these comparisons are displayed in Table 32). Falsification indices were significantly lower in the weak instruction conditions.

Table 32. Significant pairwise comparisons by rule-violation instruction condition

Rule Violation Instructions		*M Diff*	*SE*	*p* value
Moderate-Strong	Weak	0.63	0.22	$p = .042$
Very-Strong	Weak	0.67	0.22	$p = .026$

8.3.3. Discussion

The two studies reported in this chapter, were conducted to test Manktelow's claim that participants in the first, second and third selection tasks studies reported in this thesis, did not understand the selection task, and the data obtained in the first three selection task studies was no more than the product of that confusion; there were no meaningful patterns in the card selection patterns. The reason for his claim, was the absence of the facilitation effect in the first three studies. After studies two and three, Manktelow had argued that participants perhaps did not understand that they were being asked to check for evidence of rule violation in the

new selection tasks. He argued further, that if participants could be made to understand that they were being asked to check for evidence of rule violation, then the facilitation effect that is required for publication might be attained.

A mild facilitation effect was observed in the *joy* and *anxiogenic emotion-as-content, other* perspective condition in this fourth selection task, in response to the strongest cued expectation of rule-violation. That is, when participants were told that the other person had let them down in the past, and they had good reason to expect that they would break this agreement, a mild facilitation effect was observed. This condition was a little like the cheater detection tasks in which facilitation effects have been observed on some occasions in previous published studies. No other facilitation effects were observed in the remaining conditions tested in this fourth selection task. Confirmation indices were highest in the weak instruction conditions, in which participants were given no explicit reasons to believe that the other party would break their agreement, and they decreased across rule-violation instruction conditions as the instructions provided more forceful cues that the other party would break their agreement. This was the pattern in all three *emotion-as-content* conditions, and in the *self* and *other* conditions, except within the strongest rule-violation expectation instruction condition. In this condition, participants decided that they would check to see whether the other person had *kept* their agreement. Their reasons for doing so were to give this person the benefit of the doubt; as this friend, colleague or partner had let them down so often in the past, the participants felt that they might have formed an unfair opinion of them, and so it seemed fair to see if they had kept their agreement on this occasion within the task.

The falsification indices in the *other* condition formed a reflection of the pattern observed in the confirmation indices. As the confirmation indices decreased across the rule-violation expectation instruction conditions, the falsification indices increased. In the *other* condition, participants were selecting more *p* and *not-q* cards as the instructions cued greater expectation that the other person would break their agreement. In the weaker emotional context condition, *not-q* card selection increased in the *moderately-strong* instruction condition, as it had done in

response to the anxiogenic context. However, in the *low-mixed-neutral emotion-as-content* condition, participants then decided to look for look for evidence that the other person had kept their agreement in the *strong* and *very-strong* instruction conditions. In the *low-mixed* condition, it perhaps seemed less important to find evidence of rule breaking. Participants in the *other* perspective condition were not in a relationship with these people, and so might not feel motivated to find out whether they had broken their agreement within the card array; if they had broken their agreements so consistently in the past, there might be little reason to investigate their behaviour now.

In the *self* condition, falsification indices revealed a different selection pattern. Participant selection of *q* cards decreased as the expectation of rule-violation by the other party increased. *Not-q* card selection increased in the *strong* expectation of rule violation instruction condition, in response to *joyful* content. *Not-q* selection increased in the *moderate* expectation of rule-violation by the other instruction condition, in response to *anxiogenic* content. In response to *lower-mixed-neutral* content, *not-q* card selection increased in *moderate* and *moderate strong* rule-violation expectation conditions. In the other conditions, participants in the *self* perspective conditions selected more *p* cards, to discover whether the other party had perhaps kept their agreement, as participants had done in previous studies.

Telling participants in the instructions that they should expect the other party to break their agreement, made more participants in the *other* condition select more *not-q* cards in this study. The same social relationships that were present in previous studies, were present in these tasks. As has been argued in previous chapters, participants have good reasons not to find evidence that might seem to imply that the other party had broken their agreement. It was clear from the debrief session that participants understood the task, the task instructions, and they understood the significance of the card array (that turning over a diary page might reveal evidence of rule violation). They understood that they were being asked to check to see whether the other party had broken their agreement. What they seem to be doing in this task, as well as thinking about the task instructions, is thinking about these relationships as they might do in this decision situation

beyond the selection task. Participants were thinking about what to believe and how to act in the decision settings presented to them in this task, as they would do if they were thinking about checking for evidence of rule breaking by these friends, partners or colleagues in a realistic decision setting beyond the selection task.

Significant effects have been observed in the data obtained in the first four selection task studies. These effects are the result of controlling the key variables that were said to influence participant behaviour in previous studies with the old selection tasks, and manipulating factors that have been shown to influence information representation, processing and behaviour in the selection task. These results are not the product of confusion, as Manktelow has argued. Nevertheless, Manktelow was not satisfied with the findings obtained in this fourth selection task, because of the absence of the facilitation effect. A further test of Manktelow's position, is presented in the following chapter.

8.4. Summary

Two studies were presented in this chapter. These were conducted in response to the suggestion that participants had not understood that they were supposed to be looking for evidence of rule violation by the other party in this task; this explanation was offered by Manktelow to account for the absence of the facilitation effect in the previous selection tasks. The two studies that have been presented in this chapter test this claim; selection task instructions were redesigned, and several versions were constructed that led participants to a greater or lesser expectation of rule violation by the other party in the selection task. The results of these studies have been presented and discussed. It has been demonstrated in this chapter that participants understand what they are being asked to do in this new task – to look for evidence that the other party broke their agreement. It has also been demonstrated that what they do, seems to be determined by the perspective that was adopted in the task (whether they had a relationship with the other party or did not), by the relationships and the kind of agreements that are presented within

these versions of the selection task, and by the degree to which the instructions lead them to expect that the other party might break their agreement. A further perspective effect and additional context effects have thus been observed. When the factors that have influenced participants behaviour in past studies are controlled in the manner in which they have been here, it is possible to see clear patterns in the card selection patterns. In face of much evidence that the other party might break their agreement, participants in this study looked for evidence that they might have kept their agreement on at least one occasion, in case the assessment of their past behaviour was unfair. What has been demonstrated in this chapter, is that participants were thinking about practical matters in this task, rather than how they might logically prove that the other party broke their agreement. Participants were thinking about relationships, about the meaning of the other parties' behaviours, and about what the consequences of their behaviour might be, when deciding what cards to select in this task.

Chapter Nine. The Fifth Selection Task Study

The fifth selection task study that was conducted for this research programme has been presented in this chapter. This study, like studies two, three and four, were responses to Manktelow's argument that the absence of a facilitation effect in studies with the new selection tasks suggested that there might be a difficulty with the task. The old selection tasks had been used as a test of deductive reasoning, but participants were not reasoning deductively within the new selection tasks. Following study four, Manktelow argued that two key factors might account for the absence of the facilitation effect in previous studies; the fact that the card array presented only a sample of behaviours that were governed by the prudential rule, and the absence of an agent or authority figure who had set the rule that was being investigated within the new tasks. The design of study that is presented here, was adjusted to allow a test of these hypotheses. The data obtained from this study is assessed and discussed towards the end of this chapter.

9.1. Introduction

Four selection tasks had now been conducted. In the fourth, a weak facilitation effect was observed in two conditions. In the face of mounting evidence that participants *were* doing something other than attempting to achieve or demonstrate deductive competence, and were not confused by the task, Manktelow (personal communication, January, 2010) argued that the lack of a facilitation effect within the new tasks posed a major problem; if the work conducted within this research programme failed to produce a facilitation effect, it must be concluded that there was something wrong with the new task. The result of this failure would be a lack of research interest in this work and in the new task. This had been the response to previous selection task studies in which no facilitation effect had been observed. The new task instructions had been investigated for elements that might account for the lack of a facilitation effect, and potential difficulties with those had been explored. So, attention turned again to the card array. Manktelow argued that there might be a problem with the logical

status of the card array, which prevented participants from arriving at the correct deductive solution to this task (i.e., the selection of the *p and not-q* cards, or *p, not-p and not-q* if a biconditional interpretation of the rule was employed). In their rational analysis of the selection task, Oaksford and Chater (e.g., 1994; 1998), argued that deductive certainty, about whether the rule was violated within the selection task, is impossible if participants are presented with only a sample of the behaviours or cases that are governed by the rule. To achieve deductive certainty about whether a rule has been violated on any occasion, or by any object that is governed by the rule, the population of objects or behaviours must be present within the card array presented to participants in the selection task. The card arrays that were presented to participants in the first four selection tasks, were not presented as the population of behaviours that the ground rules were established to manage. It is therefore possible that participants could have interpreted the card array as being a sample of behaviours that were governed by the rule.

In their damning critique of the old selection tasks, Sperber et al. (e.g., 1995) argued that the old selection task was not one in which conditional reasoning was employed, and neither was it one in which participants tested hypotheses. The old task, they claimed, was *nothing but* a task of selection, and the selection (and selection task) was *nothing but* a task of linguistic comprehension, in which participants merely needed to determine which information within the array was linguistically relevant to their choice. Sperber at al. (e.g., 1995), argued that most previous versions of the selection task presented participants with an ambiguity, because the rule might be understood as being about a definite or indefinite range of cards or cases, of which four were presented to them in the task. The consequence of this ambiguity, according to Sperber et al. is that participants might interpret the rule as being about only the four cards, or as governing any number of unseen cases or cards. In the former case, the rule might be falsifiable and verifiable, if testing for truth or falsity of a rule. The facilitation effect, according to Sperber et al., was achieved when this ambiguity was resolved. Participants could then understand what information was linguistically relevant to the solution of this task. Sperber et al.'s argument could be extended to deontic versions of the task, and is very similar to Oaksford and Chater's description of the deductive certainty

that might be achieved if the population of cases are presented in the card array, within the selection task. Providing participants with the population of behaviours that the rule governs, would allow them to see whether the rule had been violated on any occasion by the other party.

A further criticism of the new selection task was offered by Manktelow at this time; he argued that in previous versions of the selection task in which facilitation had been achieved, there had been an *agent* who established the rule, and an *actor* who was subject to that rule (e.g., Gigerenzer & Hug, 1992; Manktelow & Over, 1991). Participants in these previous published old versions of the task, had been acting as proxy-agents. These features might, he argued, be needed to achieve a facilitation effect. Use of a proxy-agent within previous published versions of the task, might have provided a position of authority or rationale for checking to see whether the other party broke or violated the rule. In the first four studies with the new selection tasks, ground rules had been presented as being joint mutual agreements, that both parties had created to manage social arrangements. Participants had been positioned as proxy-agents *and* proxy-actors, and there was no explicit rationale within the task for their checking to see whether the other person broke their agreement. If participants were positioned as proxy-agents within the new tasks, they might then have a good reason for checking to see whether the other party broke their agreement.

To explore whether these features of the new selection tasks had suppressed a facilitation effect that might otherwise have been observed, or altered how participants approached the task, these elements were operationalized in a fifth study with the new selection tasks. The card array was presented either as a possible sample, as it had been in previous studies, or as the population of behaviours that were governed by the rule. The selection task materials were adjusted slightly, so that the ground rules were presented either as joint agreements, as they had been in earlier studies, or as ground rules that were established by one of the parties to the rule. The three *emotion-as-content* conditions that were used in previous studies were investigated here, as were the perspectives (self, other) that had been explored in study four. The inclusion of these factors allowed exploration of what the consequences of these alterations

might be, and whether *emotion-as-content* and perspective would influence participant selection patterns as they had done in the previous four selection task studies.

9.2. Method

9.2.1. Participants.

Two hundred and forty-one undergraduate and postgraduate students (male *N* = 120, age *M* = 22.00, *SD* = 2.83, female *N* = 121, age *M* = 20.37, *SD* = 1.88) from the Schools of Law, Business, Design, Medicine, Biology, Mathematics, Physics, Modern Languages, Geography and Mechanical Engineering at the University of Leeds participated in this study. None of these participants had taken part in any of the previous studies conducted within this research programme, and none of these participants had had been enrolled on reasoning or decision-making modules.

9.2.2. Materials.

The *card-array-as-possible-sample* condition was created using the task instructions that had been presented to participants in studies two and three; in this condition card array behaviours were presented as a possible sample of behaviours that were governed by the ground rule. In this condition, participants were informed that the four diary pages presented in the task, contained a record of events that followed the agreements on four different occasions, with each page representing a different occasion. On one side of each page was a record of what they (or one party) did after the agreement on one occasion, and on the other side of each page was a record of what their friend, partner or colleague did in response on that occasion. The *card-array-as-population* condition was created by altering how the diary pages were presented to participants within the selection task instructions. In this condition, participants were informed that the four diary pages contained details of all the times they were together after the agreement during the period in which the ground rule applied.

The *proxy-agent* condition was constructed by altering the scenario content. In the new selection tasks used in studies one to four, the ground rule was presented as a prudential joint agreement towards the end of the opening context, just prior to introduction of the ground rule. In a *joint-agreement* version, for example, the opening scenario concludes with one party wanting to do *x*, and the other party wanting to do *y*, and so they agree to a ground rule (which presents a fair exchange of benefits and costs between the two parties to achieve their goals). The *proxy-agent* condition was created by altering the text that appeared just before the ground rule within the opening contexts in each scenario. In the proxy-agent condition, the opening context concludes with one party wanting to do *x* and them knowing that the other party wants to do *y*, and so they get the *other* party to agree to a ground rule (which presents a fair exchange of benefits and costs between the two parties to achieve their goals). To create a greater rationale for why participants might check to see if the *other* party acted as they agreed to, an additional paragraph was added to the scenarios after the ground rule. In this, something changed within the unfolding events after the conditional agreement that gave the *other* party a mild benefit from rule-violation; the other party becomes a little anxious about doing *q* (e.g., they have not brought appropriate clothing, or know little about wine, or need to be elsewhere, or feel protective of their new car). In all previous task versions, rule adherence had been presented as a benefit for both parties. As a control, this change in rule-violation benefit and addition to the scenarios after the agreements was presented to participants in both the *joint-agreement* (added to the scenarios used in previous studies) and the new *proxy-agent* conditions that were constructed for and presented in this task, in case the change in rule-violation benefit for the *other* party altered participant behaviour.

To maintain room for the effects of *emotion-as-content* on card selection frequencies, '*or not*' was included in the task instructions, as it had been in study one. In this study, in all experimental conditions, participants were asked to determine:

which page(s) would need to be turned over (*which bits of information you would need to read or check*) to find out whether or not your friend, partner or colleague broke the ground rule that you agreed to within the situation described.

Other than the alterations described above, no other alterations were made to the task instructions, or to the *emotion-as-content* conditions. The task instructions that were used in study two and three, for *self-diary* and *other-other diary* were used here to create the *self* and *other* perspective conditions, as they had been in the fourth selection task. In these instructions there was no heightened expectation cued that the other party would break the agreement that was presented in the task. The card array and ground rules were extended across time, as they had been in the second, third and fourth selection task studies. The four scenarios that had been extended across time for study two, were used in this study.

9.2.3. Design

A 2 perspective (*self*, *other*) by 2 agreement status (*joint*, *proxy-agent-actor*) by 2 card array (*sample*, *population*) by 3 emotion-as-task-content (*joy*, *anxiety*, *lower-mixed-neutral*) design was utilised for this study. Perspective, agreement status, and card array were operationalized *between-subjects*. *Emotion-as--content* was measured *within-subjects*. Participants were presented with one *emotion-as-content* version of three different selection task scenarios, and completed one *joy*, one *anxiogenic* and one *lower-mixed-neutral* version of the selection task in this study. Card selection frequencies (*p*, *not-p*, *q*, *not-q*) were used as the dependent variable. Intended *emotion-as-content* conditions from each of the scenarios were counterbalanced across participants as they had been in previous studies. The presentation order of intended *emotion-as-content* conditions, and each of the scenarios, were counterbalanced across participants. Card array item presentation order within each of the selection tasks presented in this study, was also counterbalanced across participants; six card array orders were used to achieve this control. Participants were randomly allocated to perspective, card array and agreement status conditions using a random-numbers table.

9.2.4. Ethics

Ethical clearance for this study was obtained via the self-certification scheme from the Institute of Psychological Sciences Ethics Committee at the University of Leeds (Reference No. 09075-01). The design and conduct of this study adhered to the British Psychological Society's (BPS, 2014) code of ethics for research with humans.

9.2.5. Procedure.

This study was conducted within the study areas of the Edward Boyle Library at the University of Leeds. Participants were recruited opportunistically, within the study areas of this library (see Appendix 18 for participant information sheet). After completion of participation consent forms, participants were allocated to one of the following eight experimental conditions. Participants were allocated to either the *joint-agreement* or *proxy-agent* condition. Within each of these two levels, participants were allocated to either the *card-array-as-population* or *card-array-as sample* conditions. Within these two levels, they were then allocated to either the *self* or the *other* perspective. All participants were then exposed to the three *emotion-as-content* conditions (*joy*, *anxiogenic*, *lower-mixed-neutral*). A diagram of these levels is presented in Figure 33.

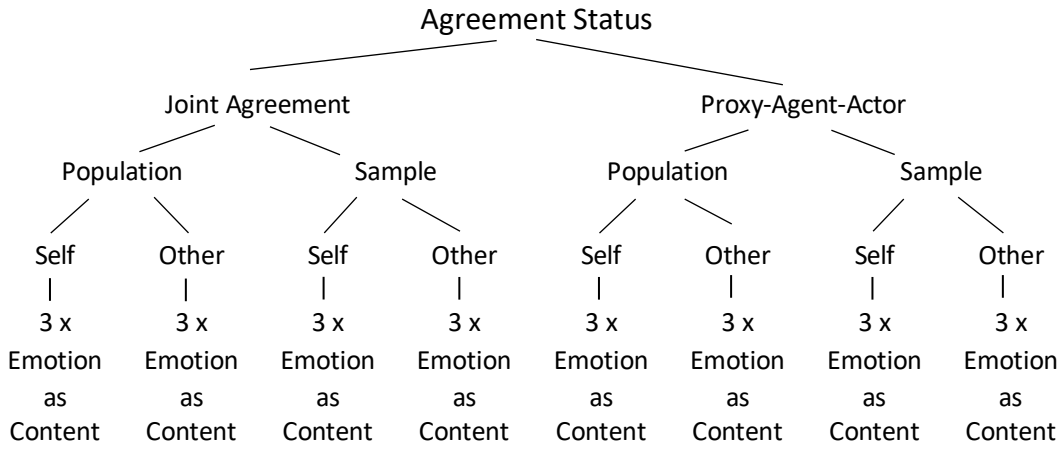


Figure 33. Experimental conditions operationalized in the fifth selection task study

All tasks were presented and completed in paper and pen format. Participants read through task instructions to ensure comprehension before starting the selection task. Participants then completed three versions of the selection task (1 x *joy*, 1 x *anxiogenic*, 1 x *low-mixed-neutral*). Participants completed the task in groups of ten to fifteen, and they were debriefed after they had completed the selection task. Task completion time was approximately twenty minutes

9.3. Results

9.3.1. Card Selection Analysis.

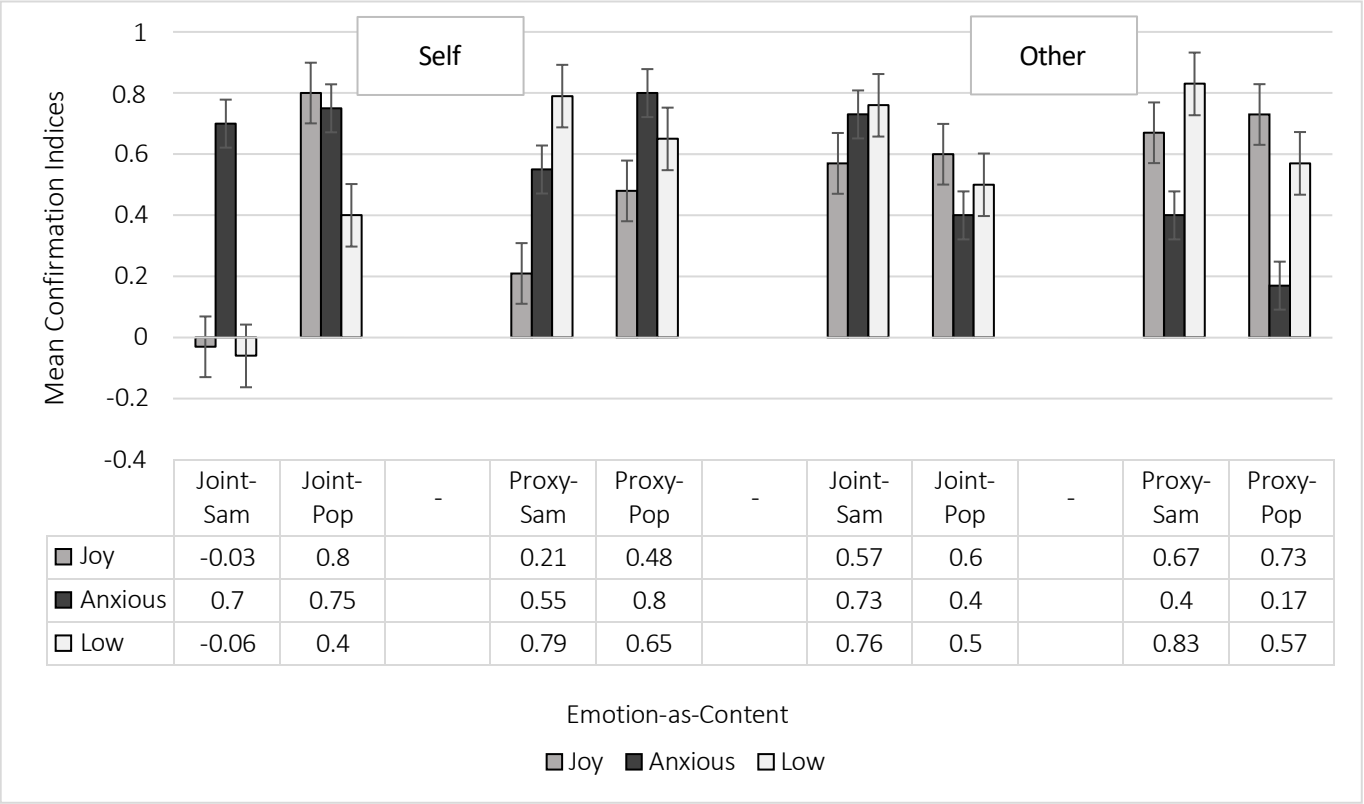
Card selection frequencies were again assessed using confirmation and falsification Pollard indices (Pollard & Evans, 1987). No significant differences in Pollard indices were observed between any of the scenarios used in this study, and so the following analysis has been reported with card selection frequencies collapsed across scenarios.

9.3.2. Confirmation Indices

An omnibus test was conducted to examine confirmation indices; all four factors were entered into a repeated measures ANOVA, to investigate whether there were significant differences between the conditions explored in this study. Emotion-as-content (*joy*, *anxiety*, *lower-mixed-neutral*) was entered as a *within-subjects* variable. Perspective (*self*, *other*), card array (*sample*, *population*) and agreement status (*joint*, *proxy-agent-actor*) were entered as *between-subjects* factors. The results of this analysis are displayed in Figure 34. No main effects of the four factors on confirmation indices were observed: *emotion-as-content* [F (2, 466) = 1.05, p = .349], perspective [F (2, 466) = 1.80, p = .181], card array [F (2, 466) = 1.42, p = .234], or agreement [F (2, 466) = 1.43, p = .233].

Two-way Interactions

No significant interaction was observed between *emotion-as-content* and agreement status (*joint vs*. *proxy-agent-actor*) [F (2, 466) = 1.49, p = .227]. Significant



	Joint-Sam	Joint-Pop	-	Proxy-Sam	Proxy-Pop	-	Joint-Sam	Joint-Pop	-	Proxy-Sam	Proxy-Pop
Joy	-0.03	0.8		0.21	0.48		0.57	0.6		0.67	0.73
Anxious	0.7	0.75		0.55	0.8		0.73	0.4		0.4	0.17
Low	-0.06	0.4		0.79	0.65		0.76	0.5		0.83	0.57

Key: Sam = sample (card array status), Pop = population (card array status), Joint = joint-agreement (agreement status), Proxy = proxy-agent (agreement status)

Figure 34. Mean confirmation indices by *emotion-as-content*, perspective (*self*, *other*), card array (*sample*, *population*), and agreement status (*joint*, *proxy-agent*)

interactions were observed, however, between *emotion-as-content* and the remaining two factors: between *emotion-as-content* and card array (*sample vs*. *population*) [F (2, 466) = 3.41, p = .034], and between *emotion-as-content* and perspective (*self vs*. *other*) [F (2, 466) = 2.96, p = .048].

With agreement status collapsed (*joint vs*. *proxy-agent-actor*), in the happy *emotion-as-content* condition, confirmation indices are consistently lower in the *sample* than they are in the *population* conditions. This difference is more marked in the *self* than it is in the *other* conditions. In the anxiogenic *emotion-as-content* condition, confirmation indices are higher in the sample than they are in the population conditions (in all but the *proxy-agent* conditions for *self*). This difference is more marked in the *other* than it is in the *self* conditions.

One significant two-way interaction was observed between *between-subjects* factors: there was significant interaction between card array (*sample*, *population*) and perspective (*self*, *other*) [F (1, 233) = 9.13, p = .003]. This interaction was described above. In the *self* condition, confidence intervals are lower in the card array as *sample* conditions, than they are in the card array as *population* conditions. In the *other* condition, confirmation indices are higher in the *sample* than they are in the *population* conditions, in anxiogenic and low-mixed-neutral content conditions. The opposite pattern is observed in the happy *emotion-as-content* condition; confirmation indices are higher in the *population* than they are in the *sample* condition.

No other significant two-way interactions were observed: between card array and agreement [F (1, 233) = 1.65, p = .201], or between perspective and agreement [F (1, 233) = 2.44, p = .120].

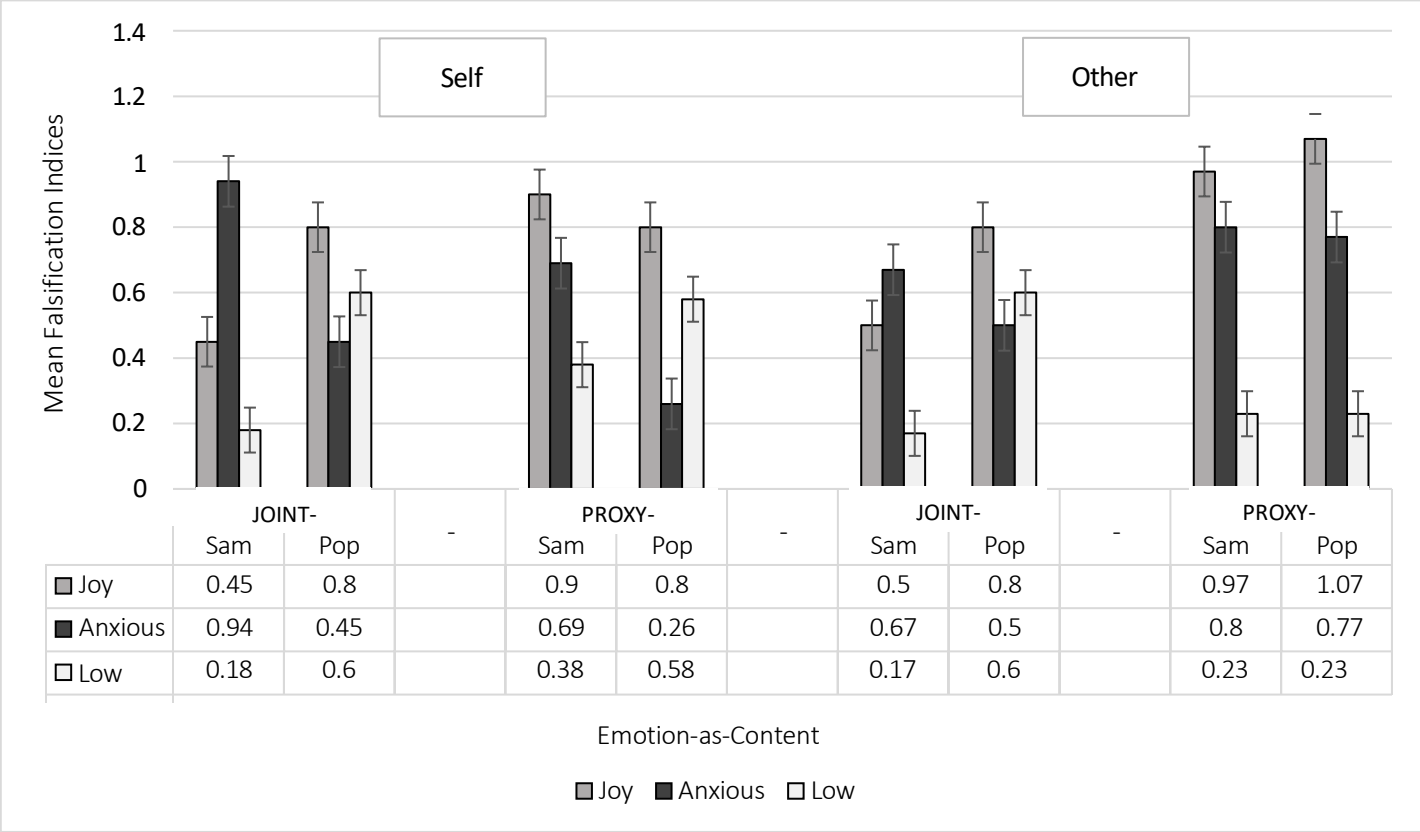
Three-way Interactions

No interaction was observed between *emotion-as-content*, card array (*sample*, *population*) and perspective [F (2, 466) = 1.26, p = .284], or card array, agreement status (*joint*, *proxy-agent-actor*) and perspective (*self*, *other*) [F (1, 233) = 2.33, p = .128]. However, a significant interaction between *emotion-as-content*, agreement

status (*joint*, *proxy-agent-actor*) and perspective (*self*, *other*) [F (2, 466) = 3.32, p = .037] was observed. In the *self*, *joint* agreement, *sample* card array condition, confirmation indices are markedly higher in response to anxiogenic content than they are in response to happy or lower-mixed neutral content. In the *other*, equivalent condition (*joint* agreement, *sample* card array), confirmation indices across emotion conditions are similar to the level observed for this anxiogenic content condition for *self* participants. In the *other*, *proxy-agent-actor* condition, confirmation indices drop noticeably in response to anxiogenic content compared to happy and lower-mixed neutral content. This pattern was observed more weakly in the *other*, *joint* agreement, card array as *population* condition. Responses to *emotion-as-content* are more changeable in the *self* conditions, across *joint* versus *proxy-agent-actor* agreement conditions.

9.3.3. Falsification Indices

Falsification indices were also assessed via an omnibus test; all four factors were entered into a repeated measures ANOVA, to investigate whether there were significant differences between the variables explored in this study. Emotion-as-content (*joy*, *anxiety*, *lower-mixed-neutral*) was entered as a *within-subjects* variable. Perspective (*self*, *other*), card array (*sample*, *population*) and agreement status (*joint*, *proxy-agent-actor*) were entered as *between-subjects* factors. The results of this analysis are displayed in Figure 35. No main effects of *between-subjects* variables on falsification indices were observed: agreement [F (1, 233) = 1.546, p = .215], card array (F < 1), and perspective (F < 1). However, a main effect of *emotion-as-content* (*joy*, *anxiety*, *neutral-lower-mixed*) on falsification indices was observed [F (2, 466) = 15.01, p < .001]. Across conditions, falsification indices are significantly higher in happy *emotion-as-content* conditions than they are in anxious (t = 1.82, df = 240, p = .035, 1-tailed; p = .071, 2-tailed), or low-mixed-neutral content (t = 4.78, df = 240, p < .001, 2-tailed) conditions. There are two exceptions to this pattern, in the *joint*-agreements, *sample* card array conditions for *self* and *other*, where falsification indices are higher in response to anxiogenic content than they are to happy or lower-mixed-neutral content. Falsification indices are also



Key: Sam = sample (card array status), Pop = population (card array status), Joint = joint-agreement (agreement status), Proxy = proxy-agent (agreement status)

Figure 35. Mean falsification indices by *emotion-as-content*, perspective (*self*, *other*), card array (*sample*, *population*), and agreement status (*joint*, *proxy-agent*)

significantly higher in anxiogenic content conditions than they are in lower-mixed-neutral content conditions (t = 3.30, df = 240, p < .001, 1-tailed).

Two-Way Interactions

One significant two-way interaction was observed. No interactions were observed between *emotion-as-content* and agreement status (*joint vs*. *proxy-agent-actor*) [F (2, 466) = 2.21, p = .111], or *emotion-as-content* and perspective (*self vs*. *other*) [F (2, 466) = 1.054, p = .349], or card array (*sample*, *population*) and perspective (*self*, *other*) [F (1, 233) = 1.34, p = .248], or card array and agreement status [F (1, 233) = 1.97, p = .162]. An interaction was observed between *emotion-as-content* and card array (*sample*, *population*) [F (2, 466) = 8.62, p < .001]. Falsification indices were highest in anxiogenic, and lowest in lower-mixed-neutral, content conditions in *sample* card array conditions. In card array as *population* conditions, falsification indices were highest in happy content conditions, and similar in anxiogenic and low-mixed-neutral *emotion-as-content* condition.

Three-way Interactions

No significant three-way interactions were observed for falsification indices: between *emotion-as-content*, agreement and perspective [F (2, 466) = 1.82, p = .164], and between *emotion-as-content*, card array and perspective [F (2, 466) = 1.83, p = .159]. All other effects were *n.s*. (Fs < 1).

Participant Feedback

Participant feedback after the task helps to interpret these selection patterns. In the *self* (i.e., where participants imagined themselves within the scenarios), *joint* agreement, card array as *sample* condition, falsification indices were highest in response to anxiogenic content. Participants in this condition selected more *p* and *not-q* cards, to see whether their friend, partner or colleague had broken their agreement. In response to content that evoked joy, these participants selected more *not-q* cards than they did when responding to content that was designed to evoke low-mixed or neutral emotional responses. Falsification indices were a little

lower in the *self*, *proxy-agent-actor* agreement, card array as *sample* condition in response to anxious content, and then again lower in the *self*, *joint* agreement card array as *population* condition, and then lower again in the *self*, *proxy-agent-actor* condition, all in response to content that was designed to evoke anxiety. In the *joint*, *sample* condition, in response to anxiogenic content, participants were concerned that the other person had broken their agreement, and selected more *p* and *not-q* cards to see if they *had* broken the agreement. In the *proxy-agent-actor*, *sample* condition, participants were a little anxious about behaving too unreasonably, or behaving in a way that might seem unreasonable; they had established the agreement and felt like they might seem 'crazy' or 'too demanding', if they checked on the other persons' behaviour too thoroughly to see if they had broken their agreement. This anxiety or reluctance seemed to increase across these *self* conditions. In the card array as *population* conditions, and particularly in the *proxy-agent-actor* role, participants felt reluctant to behave in a way that they felt 'seemed over the top' or 'bullying' (i.e., by checking the cards too thoroughly, when all the behaviours that were relevant were in front of them, and particularly when they had established the ground rule). The tighter constraints imposed on them within the population and proxy-agent-actor conditions, reduced selection of the *p and not-q* cards and did not therefore evoke a 'facilitation' effect. This was not the result of confusion, or the result of their failure to understand the task. Participants *understood* the significance of the conditions presented to them in this study. What they were trying to do in this selection task, as participants had done in the earlier selection tasks, was negotiate personal relationships within the contexts presented to them in this task.

In response to content that had been designed to evoke happiness (and the lower-mixed-neutral condition), participants in the *self* condition, behaved similarly across the remaining conditions; in these emotional contexts there seemed to be fewer negative associations attached to checking up on their friends, partners or colleagues. The role of *proxy-agent-actor* and the card array as *population* rather than *sample* seemed to increase participants' selection of *not-q* cards, but they also increased their selection of *p* and *q* cards, and so no facilitation effects were

observed in these conditions. Participants felt that it was more acceptable to check on the behaviour of the other party in the joyous settings; their checking behaviour was thought to have fewer negative possible consequences for their relationships. In the lower-mixed-neutral conditions, participants felt that it was less important or necessary to check on the other person's behaviour, and felt less need to check the cards thoroughly there.

Participants in the *other* perspective condition (in which they were not asked to imagine themselves in the scenarios described), participants selected fewer *not-q* cards in the card array as *sample* conditions, than they did in the equivalent card array as *population* conditions. They also selected more *not-q* cards in the *proxy-agent-actor* conditions than they did in the *joint* agreement conditions. Participants thus seemed to respond to these factors. In the *other* condition, participants generally selected more *not-q* cards in response to content that was designed to evoke joy, and least in response to content that was designed to evoke few if any emotions (the lower-mixed-neutral content conditions). Participants in the *other* conditions did not report the same concerns that participants in the *self* condition had (about 'bullying' or seeming to be 'crazy'). However, in these conditions participants reported that the other party might have had good reasons not to keep their agreements, and so it might be too strict to label this behaviour as rule breaking; these concerns were greatest in response to anxiogenic content but were expressed in all conditions. In situations that seemed 'less important' (i.e., the *lower-mixed-neutral* emotion as content conditions), and in the remaining two emotional contexts, participants in the other conditions said that if they found evidence that the other party had *kept* the agreement, this might be enough to determine that they had not broken their agreement.

9.4. Discussion

This fifth selection task was conducted to explore Manktelow's suggestion that the logical status of the card array (as sample, or population), and the inclusion of a proxy-agent in the new selection tasks, might produce a facilitation effect. The inclusion of both factors altered participant responses in the new selection tasks,

and participants were sensitive to the ways in which these factors influenced the decision context. However, neither of these factors here produced a facilitation effect. For participants in the *self* condition, in which they imagined themselves within the situations described, both factors made them more reluctant to select the *not-q* card, and more reluctant to point out or draw attention to the fact that the other person seemed to have broken their agreement. As in the previous selection tasks that have been conducted in this research programme, participants seemed to be pursuing important practical goals within this task; they were focused on pragmatic considerations, about possible mitigating circumstances and the meaning of the other person's behaviour, and about what the consequences of their selection might be, for their relationships with the person who might have broken their agreement. As before, they were doing more than deciphering linguistic relevance when deciding how to act in this task. Anxiety seems to influence behaviour differently, according to context, and according to what threats participants are attempting to negotiate within those contexts. Participants seem to be concerned about more than the possibility that the other party cheated, particularly when anxious; other threats or potential costs or benefits are influencing behaviour in these settings.

In the social relational contexts that have been created in these first versions of the new selection tasks, it is perhaps not necessary to include the population of cases that are governed by the rule within the card array, to allow discovery of evidence that the other party broke the rule. One instance of rule violation might be sufficient to establish that they broke the rule. However, it seems that participants are not keen to search comprehensively for evidence of rule violation by the other party in this task. They seem to take a sample of the other person's behaviour and consider this to be sufficient within the task; they satisfice (e.g., Evans, 1996; 2007; Simon, 1959). They perhaps select the information that satisfies their goals, and relationship goals might be an important influence of participant behaviour in these first tasks. Some participants examine their own behaviour in the process of deciding what to do, before deciding how to act towards the other party; if the participant broke the agreement on one occasion, then they could not expect the

other person to continue with their agreement. At times participants have sought to reframe the task; in seeking evidence that the other party has kept the agreement on one occasion, they can offer this as evidence of the other person's good will, and as that being all that is required of the other party within their relationship and within the task. Participants are, it seems, reluctant to act in a way that might be unfair, or over-bearing, or too demanding within their relationships with friends, partners, or colleagues, and they demonstrate this in their card selections within this task. They might behave differently in other social relationships, or in different circumstances where the importance, or the benefits and costs associated with their behaviour were other than they are in these versions. If, for example, they were looking for evidence of rule-breaking by the other person, and the discovery of that behaviour prevented a more feared or costly outcome, participants might be much more willing to select the *not-q* card.

No participant searched all cards, and no participant selected only the *p* and *not-q* card in every *emotion-as-content* version of the selection task that they completed, within these new selection task studies. Participants do not seem to be seeking to maximize their knowledge of how the other party behaved after agreeing to their ground rule, or maximize their understanding of whether the other party, strictly speaking, broke their ground rule. Participants are therefore not behaving as Oaksford and Chater (e.g., 1998, 2002) argued they do in the old selection task studies; maximization of information gain is not the main factor driving participant behaviour, in the decision contexts presented within the first versions of the new tasks. It might be argued that this is because turning over the cards will not provide them with enough information to allow them to determine whether the other party broke their agreement. If mitigating circumstances were to be considered, the behaviour of the other party might be excused. Even without mitigating circumstances, the behaviour of the other party might be excused; demanding that a friend, partner or colleague adhere to the prudential agreements that have been established between you, or searching for evidence that they had broken your agreement, might not be common features within valued relationships. Some people might find such behaviour rewarding and attractive, other people will not.

Further than this, it seems unlikely that a comprehensive array of information, which would allow you complete access to all decision relevant details, would be available in *any* realistic decision situation, particularly of the kind that is presented in the new selection tasks. It would be odd then for participants to view the card array as something that provided them with a comprehensive account of the details that would be needed to guide their selection of cards, within the new selection task. Decisions are made in the absence of complete information. The importance of this gap in our knowledge, and of what the consequences of our decisions might be, varies. Some consequences are much more important than others. In this context of uncertainty and incomplete knowledge, decisions are influenced by the context in which they are made, by important concerns and goals, for example, and by preferences, and habits. We have no God's eye view. The full consequences of what our decisions and actions will be are not known when we act, but we often consider what the consequences of our actions might be before we act, as participants are doing in these new tasks. The factors that are guiding participant selection behaviour in this task, might guide their behaviour in everyday decision-making settings, when they decide how to negotiate their relationships with friends, partners, or work colleagues.

Sperber et al.'s (e.g., 1995) critique of the old selection tasks is perhaps understandable. The old selection tasks in which facilitation was achieved (within the cheater detection paradigm), by telling participants that 'person A' would break the rule, and then asking them to select the card or cards that showed that 'person A' had broken the rule, might be described as a test of verbal comprehension. The contents of those cheater detection studies did not focus on joint prudential agreements that have been established between friends, partners or colleagues to manage social arrangements. They concerned social roles in which people had good reasons for checking for evidence of rule breaking. In the new selection task, however, participants are doing much more than determining the linguistic relevance of *p*, *not-p*, *q* and *not-q*, in selecting evidence that might show evidence of rule violation by person A.

It might be argued, convincingly, that a plausible rationale for checking for evidence of rule violation by the other party was not presented (in the *proxy-agent-actor* condition) in this study. Participants were again situated within the relationships that were presented in the first four selection tasks. Although the participant (in *self* conditions) was positioned as the person who established the ground rule in this study, the ground rule was a pragmatic social arrangement that carried little or no authority over the other party[40]. Participants were not positioned as managers, or parents, or teachers, or in any role in which they might be expected to hold some authority of the other party. If a better test of Manktelow's argument were to be conducted, a facilitation effect might be observed in the new selection task. However, it is not clear why a facilitation effect should be regarded as a necessity in this new selection task, or desired within the decision contexts that were presented to participants in the first five studies with the new tasks. This argument is continued in the closing discussion, which is presented in the following chapter.

9.5. Summary

The study that has been presented in this chapter was the fourth response to Manktelow's arguments that the absence of a facilitation effect in the card selection behaviour of task participants, represented a major problem for the new selection tasks, because it suggested that there was something wrong with the instructions, or design, that was preventing participants from reasoning deductively within this task. It has been clearly demonstrated in this and the previous empirical studies with the new selection tasks, that participants *are* reasoning in the new selection tasks, and that they are doing so in a way that might reasonably be regarded as being rational in the sense of rationality$_1$ (Evans & Over, 2004). In light of the evidence presented in this chapter, it is clear that most participants are not attempting to reason deductively in the new selection task. What they are doing, as has been

[40] How participants view this factor, is another element that will be influenced by their relationships with others. If participants have relationships with friends, partners, or colleagues in which they are used to getting the other person to do what they tell them to do, participants might read more authority into their establishment of this ground rule in this study.

demonstrated above, is reasoning about practical matters that might affect the behaviour of themselves or others, and using these considerations to guide their behaviour in selecting from the card array within this task. They are reasoning about relationships, and goals that seem important within the decision contexts presented to them in these tasks. The perspective effect between self and other that has been observed in previous studies has also been evidenced here; again, this interacts with the other key features that are manipulated within the task. The decision contexts presented here affected *self* and *other* perspective participants differently, and did so in ways that were entirely fitting with their respective roles and goals. Manipulation of the card array and agent perspective also influenced participant behaviour in these tasks, and these factors again interacted with the *emotion-as-content* conditions. Participants were sensitive to the significance of these factors in the decision context, however they reduced the selection of factors that might show evidence of rule violation by the other, in the *self* condition, and they did so for good reasons. Additional context effects have thus been demonstrated in this chapter.

Chapter Ten. Closing Discussion

This final chapter provides a final summary of the findings that were obtained within the current research programme. Within its pages arguments have been presented to outline why this work is important, how it fills gaps within literature, and how the continued importance of the selection task has been demonstrated. Implications of the current work for future research and theoretical accounts of the areas researched in this work have also been discussed. Limitations of research presented within this thesis have been presented, with recommendations for how these might be improved upon in future work. Clear suggestions for future work have then been discussed.

10.1. Two Key Goals. Task Construction and Emotion (plus factors)

1. Develop the Selection Task

Two key or overarching goals were pursued in the research programme that has been reported in this thesis. The first of these was to develop the selection task, which had been largely discarded as a suitable research vehicle through which we might usefully investigate or improve our understanding of human reasoning or decision making, so that the selection task *could* be used to do just that – to investigate human reasoning and decision making, and in so doing, improve our understanding of this kind of information processing, *and* how this might influence behaviour. The first goal was thus to demonstrate that the selection task has continued importance; that it had been a mistake to discard the task because of the difficulties that have been associated with the way in which was used in the past.

Previous versions of the selection task had been used to assess whether task participants' reasoning accorded with the rules of deductive logic (e.g., Cosmides, 1989; Evans, 1982; 1996; Gigerenzer & Hug, 1982). When it was demonstrated in hundreds of previous studies with the old deontic and indicative versions of the selection task, repeatedly, in one study after another, that most participants were not reasoning according to the rules of deductive logic within this task (or not doing

so successfully), the task and or participants were blamed for this state of affairs (e.g., Evans & Ball, 2010; Fodor, 2000; Gigerenzer & Hug, 1992; Sperber et al., 1995). It was concluded that there must be something wrong with the task, and or with participants understanding of the task. Participant behaviour was influenced by the content and contexts that were presented to participants within the old selection tasks; according to old normative accounts of deduction, this kind of thinking should not be influenced by these factors (e.g., Evans, 2002; Piaget, 1970; Wason, 1966; 1968; 1969). Human beings should be able to separate themselves from what seemed to be the erratic or capricious influences of content and context, and reason according to fixed logical rules.

Despite many attempts to discover the conditions or *contexts* in which participants *might* be encouraged to reason according to the rules of deductive logic within the old, published versions of the selection task, it seemed that most participants could not be encouraged to reason in this manner within the task. This old way of thinking about the selection task was evident in Manktelow's responses to each of the selection task studies that have been presented in this thesis; he responded to them *as if* they had been designed to evoke deductive reasoning, and interpreted the absence of the facilitation effect as being evidence that there must be *something wrong* with the task, the way in which it was presented, or in participants' understanding of the task or instructions. However, the new selection tasks were *not* designed to be a vehicle through which we might investigate and observe deductive reasoning. It was clear from the hundreds of failed previous attempts to do just that, that the selection task might not be a useful research vehicle via which we might investigate deduction. Rather, the new selection tasks were designed to be useful research vehicles through which we might investigate *practical* reasoning, about what to think and how to act when thinking about ordinary prudential conditional agreements (e.g., Blackburn, 1998; Greenspan, 2004; Mameli, 2004; Manktelow et al, 2000; Over & Manktelow, 1993). In the versions that were tested in these first studies, the prudential agreements were pragmatic ground rules that had been established to manage practical social arrangements and their relationships, between friends, partners or colleagues. The new selection tasks have also been designed so that they can be easily adapted for

use in other settings, so they can be used in many future research projects, in decision contexts other than the ones investigated here.

2. Use the New Selection Tasks to Investigate Effects of Context

There is absolutely no need to view or to use the selection task as a test of deductive logic, as has been demonstrated in this thesis. However, it *can* be used as a useful research vehicle through which practical reasoning can be investigated. The data obtained from investigations with the new task can increase our understanding of what factors might influence practical reasoning, as has been demonstrated in the studies presented here. The kind of reasoning that has been observed in these new tasks, has been given very little research attention in previous research studies. The kinds of social contracts that were investigated in these selection task studies have received very little previous research or theoretical attention. This gap in current theoretical accounts of thinking and reasoning is important; these kinds of practical arrangements are a common feature of our everyday lives. They can be made in mundane circumstances, as they were designed to be within the decision contexts that were presented in the current research projects. However, what has been demonstrated in these research studies, is that what might seem to be mundane arrangements can be an important arena in which ordinary relationships are negotiated. The participants in these studies demonstrated that their searching for evidence of rule violation by a friend or partner or colleague, could have far reaching and serious consequences for their relationships, not only with the person whose behaviour they were checking, but also in their relationships with other friends, family, or work colleagues. Whether checking for evidence of rule violation by the other party was acceptable, seemed to be a major influence on participants' behaviour in the new selection tasks. This judgement was influenced by the context in which it took place, the emotional state participants were in when checking, what events were happening at the time (whether they were enjoyable, or anxiogenic, or of little real emotional significance or importance), and who was checking for evidence of rule breaking by whom (whether a friend, or partner, or work colleague, or unknown

other party). Checking for rule violation seemed to be generally more acceptable when the person whose behaviour was being checked, was not known by the party who was checking. A second goal that was pursued in this research programme, was thus to use the new tasks to investigate and influence how specific emotions, and other elements within a practical decision context might influence reasoning, decision making and choice, within the new deontic versions of the selection task. The achievement of both goals demonstrates the continued importance of the selection task.

10.2. Summary of Findings

In the first selection task study, in which emotion was operationalized as a *within-person* factor, as background emotional state in which they encountered the selection task, and as a *within-task* factor, as an aspect of the opening decision context in which the pragmatic agreements were made between friends, partners or colleagues to manage practical social arrangements, an interaction between emotion as background state and emotion as context was observed. Anxious participants were, as predicted, more likely to look for evidence of rule violation across *emotion-as-content* conditions; they were more likely to search for evidence of threat in different decision contexts, but they did so most strongly in response to content that was designed to evoke anxiety. Participants in an anxious background state, however, had different expectations in the happy and anxious *emotion-as-content* conditions. In the happy contexts, they hoped to discover evidence that their friend, partner or colleague had *not* broken their agreement, and that their fears would not be realized. In anxious contexts, anxious participants seemed to expect that their fears would be confirmed: that the other part had broken their agreement. These findings are in line with predicted effects, which were drawn from the attentional, interpretative and expectation biases observed in anxiety (e.g., Eysenck et al., 2007; Mogg & Bradley, 1998; Richards et al., 2014). Angry participants in the first study also behaved as predicted; they were more likely to look for evidence of rule breaking by the other party in response to the anxiogenic context, but not in response to the happy or lower-mixed-neutral content. This

observation is in line with the attentional or interpretative biases that have been observed within studies that investigated responses to single words, or to vignettes that described the behaviour of others. In happy and lower-mixed-neutral context conditions, angry participants were much less likely to behave in this manner. Participants who were in a happy background state when they encountered the selection tasks, were more likely to look for evidence of rule breaking in response to *anxiogenic* rather than *happy* or and *lower-mixed-neutral* content conditions, but they did so less than participants who were in anxious, angry and neutral background state conditions. In response to happy contexts, happy *within-person* participants were much more likely to look for evidence that the other party had *kept* their agreement.

In this first study, many participants expressed the opinion that checking on the behaviour of a friend, or partner, or colleague, to see whether they had broken an agreement was not an acceptable way to behave, and the action of doing that 'felt wrong'. This response was observed within all the studies that were conducted with these first versions of the new selection tasks, in the five different selection task studies that have been presented in this thesis. Thinking about rule breaking or checking to see whether another person has broken an agreement in this way, has not been investigated in previous reasoning studies. Although this response seems important and rational (e.g., De Sousa, 1990), it has not been included in theoretical accounts of reasoning. Practical social reasoning, or thinking about how to behave within practical prudential social settings, has featured in relatively few empirical investigations (although see e.g., Hilton, 1995, and Mercier & Sperber, 2011, for important exceptions).

In the second selection task study, having to look through the diary of a friend to determine whether a friend, or partner or work colleague, had broken an agreement was not something that most participants were keen to do; the thought of behaving in this manner seemed to evoke emotions such as anxiety and guilt, because the behaviour was regarded as something that one should not do. This reluctance, and perhaps these emotions, seemed to influence participant selection behaviour. Confirmation indices were generally higher across *emotion-as-content*

conditions when participants were asked to check the diary of another for evidence of rule violation. However, when they were asked to check their own diary for evidence of rule violation by the other party, participant selection patterns interacted with *emotion-as-content* conditions; in contexts that were designed to evoke anxiety, participants were more likely to look for evidence that the other party had *kept* their agreement, to provide evidence that the other party *had* acted in good faith on at least one occasion. In response to contexts that were designed to evoke happiness, participants seemed to be more willing to look for evidence that the other party had broken their agreement, although even here they reported that they were looking for evidence that the other party had *kept* their agreement so that they could demonstrate that the other party had done as they had agreed. Participants thus seemed to reframe the task.

Participants were mindful of mitigating circumstances when they considered whether behaviour displayed within the card array might provide evidence or rule breaking. Within the relationships investigated in these studies, evidence that the other party had kept the agreement on one occasion seemed to be all that was required within that relationship to dismiss any claim that the other might have broken their agreement. Participants were keen to explain that there may have been good reasons why the other party could not keep to the agreement on other occasions, and in those circumstances they seemed reluctant to interrogate the behaviour of the other party for evidence of rule violation. Participants seemed to be motivated to protect their relationships when reasoning from the *self perspective* about their relationships with friends, or partners, or work colleagues. Perhaps their desire to act in a way that is fair, which participants in these studies expressed, is an element of wanting to protect a relationship.

The third study reported here replicated the data obtained in the second selection task study, providing evidence that the effects obtained were reliable, and not the result of confusion or a failure to understand the instructions or task. In the fourth selection task study reported in this thesis, participant expectation of rule-violation by the other party was manipulated in five task instruction conditions. Expectation

that the other party would break their agreement varied from weak to strong. *Self* and *other* perspectives were operationalized in this study, as were the *emotion-as-content* conditions that had been used in previous studies. In response to the heightening of expectation via task instructions that the other person would break their agreement, confirmation indices decreased for *self* and *other* perspectives, and falsification indices increased in the *other* perspective condition, in line with the stronger expectation of rule- violation by the other. Until, that is, participants were presented with the strongest rule-violation expectation instructions, in which they were told that the other party had let them down on many previous occasions, and it seemed unlikely that they would keep this agreement. In response to this suggestion, participants searched for evidence that the other party had *kept* the agreement on this occasion. The given reason for this change in behaviour was that participants did not want to be unfair to the other party, by prejudging their behaviour in that manner. Fairness was thus again a concern of participants who completed these new versions of the selection tasks. For participants in the *other* condition, falsification indices were higher in in more intense *emotion-as-content* conditions (i.e., happy and anxious) than they were in the lower-mixed-neutral content conditions. Checking for evidence of rule violation by the other seemed to be more important in the more emotional contexts; participants regarded rule violation or adherence as being more important in the more intense *emotion-as-content* conditions.

As they were in the earlier studies, card selection patterns in this study were influenced by the perspective (*self vs*. *other*) that participants were asked to adopt in the task. Participants in the *self* and *other* conditions responded differently to the new selection tasks, which was demonstrated in different falsification indices observed between perspective groups in this study. In the *self* condition, participants selected more *p* cards to give the other person a fair chance of being shown to have either kept or broken the agreement. A perspective effect of *self* versus *other* was thus again demonstrated in the fourth study. Whether participants imagined themselves within the scenario, and that the events

concerned themselves, friends, partners or colleagues, or imagined that the situations described unknown other peoples' behaviour and experiences influenced how they responded in these tasks. This perspective influenced what goals, and concerns were expressed within the tasks.

In the fifth selection task study presented within this thesis, additional elements of the data array and decision context were manipulated to investigate how these factors influenced participants behaviour in the new task. The card array was presented as either a sample of all possible behaviours that were governed by the rule, or as the population of behaviours that were governed by it. Agreement status was manipulated to test whether the nature of the agreement (whether it was a joint agreement or had been imposed by a proxy-agent), influenced participant behaviour in the task. *Emotion-as-content* and perspective (*self vs*. *other*) were again manipulated in this study, to allow examination of how these factors would interact with the altered decision context.

A perspective effect was again observed in this study. Participants were asked to imagine themselves within the decision context, or that it was describing the behaviour and experiences of unknown others. Participants in both perspective groups were sensitive to the manipulation of card array as *sample* or *population*, and to whether the agreement had been made jointly or whether it had been imposed by one party within the agreement. In the *other* condition, presenting the card array as the population of behaviours that were governed by the rule rather than a sample of behaviours, resulted in a slight increase in falsification indices in the *happy* and *lower-mixed-neutral* conditions. Presenting the agreement as being introduced by one of the parties rather than it being a joint agreement, resulted in higher falsification indices in *happy* and *anxiogenic emotion-as-content* conditions. In the proxy-agent condition, participants expressed concerns that labelling the other persons behaviour as being evidence of rule violation might be unjust, because they may have good reasons for not keeping to the agreement. They were particularly concerned about this being true within the contexts that had been

designed to evoke anxiety. In the *other* condition, participants also expressed the belief that if they found evidence that the other person had kept the rule on one occasion, this might be sufficient to determine that the other party had kept the agreement, whether they had done so on all occasions or not.

In the *self* condition, although falsification indices increased in the *happy* context for joint agreements in the population condition, and in the *anxiogenic* context for joint agreements in the sample condition, participants in the *self* condition were less likely to check for evidence of rule violation by the other party in the proxy-agent condition when they had been the agent, and in the population condition. The reasons given for this behaviour by participants in the *self* condition was that they did not want to seem unreasonable, or deranged, or unfair in their interrogation of the other person's behaviour for evidence that they had broken their agreement. Participants realized that the changed card array in the population condition provided them with the behaviours that were governed by the rule. In the population context, rather than searching more thoroughly for evidence of rule violation by the other party, participants selected less evidence of rule breaking by the other because they were worried how their behaviour might be judged by other people. Comprehensive searching for rule breaking by a friend or partner or work colleague was regarded as being unreasonable behaviour in this context. This was particularly true if participants had been the agent and it was they who had imposed the rule.

10.3. Implications.

10.3.1. A Need for Facilitation.

It seems necessary to address the suggestion that facilitation is required in these new versions of the selection task. Manktelow' arguments that were considered and tested within the work that has been presented here, were the result of his experience of the old selection task. The new selection tasks are not in some ways like the old selection task. The factors that were left free to vary in the old selection

tasks, have not been left as free to vary in the new selection tasks. This increased control of variables that have been shown to influence behaviour represents a substantial move away from the old approach to the selection task. Factors that were said to influence participant behaviour in previous versions of the selection task, were identified and controlled within the new selection tasks. Achievement of this control provides us with a research vehicle in which the effects of context and content on reasoning and decision making can be investigated, as has been demonstrated in the studies that were presented in this thesis. Achievement of this control also represents an endeavour to take seriously previous research that provided evidence that reasoning and decision making are influenced by context and content. Context matters. There is overwhelming evidence that this is true within many different areas of perception and cognition. There is no good reason to suppose that all kinds of reasoning might not also be influenced by context. If reasoning and decision making are influenced by context, we need to understand in much greater detail than we do now how context influences reasoning and decision making in different, applied settings. This new task provides a vehicle that can be used to model different practical, applied decision contexts, through which we can investigate what influence key elements within those contexts have on reasoning, decision making and choice. This work presents an important goal for future research with the new selection task.

Sperber et al. (e.g., 1995) argued that reasoning and inference are communicative acts. Within the old selection tasks and when reasoning in general, these authors seem to argue that when interacting with others through language, all one needs to do is to determine what relevance the speaker or writer intended to convey through communication. That information then drives a behavioural response. There is much evidence within the studies presented within this thesis, that their account fails to provide an adequate description of participant behaviour in the new selection task. After determining what was linguistically intended by a speaker or writer within the selection task, participants might then determine what they should believe, how the information relates to their current goals (which might be more than performing well in this task), and what the consequences of their

behaviour might be. 'In real life', to borrow the term used by Sperber at al. (1995), one often thinks about what the consequences of what one's behaviour might be before one acts.

These authors, like most researchers who have written about the selection task, were measuring, and judging participant behaviour against the old normative standards of deduction. Manktelow's critiques that have been presented here were based on this same standard. 'Correct' card selection in this task was identified as being selection of only the *p and not-q* cards[41]. These are the cards, it might be argued, that a participant *should* select in this task, if they are reasoning according to the principles of deductive logic. However, there is no good reason *why* participants *should* use deductive logic when determining what to think and how best to act in practical matters that concern the negotiation of social relationships with friends, partners, or colleagues. *This* is what most participants are doing in the new selection tasks. There seems to be no good reason why deductive logic should be positioned as the gold standard within theoretical accounts of practical reasoning. Advocates of the descriptive approach to reasoning, thinking and decision making (e.g., Evans & Over, 2004; Elqayam, 2008), have argued that the normative models of reasoning and decision-making fail to provide adequate accounts or predictive models of practical thinking and decision making. Within this context it is difficult to understand why the old normative standards should be used to assess performance in this new selection task.

Although normative accounts perhaps provide important ways of understanding some behaviours (e.g., Stupple & Ball, 2014), they do not provide an adequate or valid account of the behaviour of participants in these first studies with the new selection task. Neither do they offer an appropriate standard against which the behaviour of participants in the studies presented in this thesis should be judged.

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[41] Unless a biconditional interpretation of the rule is employed, in which case *not-p* might also be selected.

The facilitation effect was seen by some as being the product of deductive reasoning. It might have been, in some participants and in some versions of the old selection task. No facilitation effect was observed in the data obtained in these first studies with the selection task. As participants were attempting to achieve practical goals within these studies rather than attempting to reason deductively, this is not surprising. Many participants seemed to be pursuing more complex goals within the relationships that are depicted in the task, rather than simply turning over cards that might reveal evidence that their friend, partner or colleague has not done as they had promised within their agreement within this selection task. These goals presumably are regarded as being more practically and personally important than pointing at evidence to show that the other person had cheated them. The cost of doing that to the relationship in focus was unknown, but the damage that might result from behaving in that manner was an important concern of participants in the new task. In pointing at evidence of possible rule breaking, they might have been mistaken, or seemed to be inconsiderate or unkind. The costs of those consequences might be far reaching, as participants in the first major rating of selection task materials explained; what might seem to be trivialities can lead to lengthy and troublesome difficulties in relationships with others in the real world.

From the data published in this thesis, it seems that explicit cuing of rule-violation expectation is NOT sufficient to achieve a facilitation effect, neither were the other adjustments that were made to test Manktelow's hypotheses. It seems probable that the locus of an apparent facilitation effect (and its absence) will be found in the goal-related perceived cost-benefit distribution of situation outcomes and the consequences of the selection. Evans' and Overs' (2004) decision theoretic interpretation of the selection might be used to model the kinds of factors that have been presented herein.

The question that perhaps seems most pressing about the absence of a facilitation effect in the studies presented here, is why such an effect would be required or desired within the new versions of the selection task. If the facilitation effect is a measure of deductive reasoning, and participants are pursuing practical goals

within the new tasks, what value might be added by judging their behaviour against the old normative standard of deductive logic. Furthermore, it is difficult to understand what *real* benefit might be obtained by participants in the new tasks, or by people in decision contexts that were similar to the ones modelled in the new tasks, in using deductive reasoning to expose a friend, partner or colleague, to demonstrate that they had broken an agreement. There is no need to see the new selection task as a test of deductive reasoning, nor is there any need to use it in this manner, or to demand that participants conform to outdated normative standards when they are pursuing practical goals.

10.3.2. An Important Perspective Effect: Self vs Other.

An important perspective effect has been identified within the work conducted for this thesis, which has not been investigated in previous research studies, and which has not been included in theoretical accounts of reasoning – that between self and other. It was a robust effect; it was observed in all studies in which it was operationalized, to explore what effects this difference in perspective might have on behaviour within the new selection tasks. The inclusion of this factor within the current work had been exploratory. This research project was a largely exploratory endeavour, to discover whether it was possible to control the key factors that had influenced participant behaviour in previous versions of the selection task, and to do so within one study so that the effects of manipulating key variables might then be visible within the data. The investigation of how emotion might influence participant behaviour within this programme was also largely exploratory – in the endeavour to construct a selection task that could be used to induce targeted emotions, so that the effects of these on reasoning and choice behaviour might be investigated (whether this would be possible was unknown). There had been so few previous studies that had investigated how emotions might influence reasoning, and those that there had been were flawed.

As the research was largely exploratory it seemed worth including this perspective within the design, to discover whether it would influence behaviour in the tasks. Intuitively, it seemed that this difference in perspective would result in different

goals, and a different appraisal of benefits and costs. This perspective seems to be an important practical consideration within many real-world decision contexts (whether one is thinking about oneself rather than another), because the consequences of a decision or choice seem likely to be different in these two perspective conditions. This perspective seems to be about personal relevance, about whether and how the consequences of your choice impact upon your relationships, and perhaps more broadly within other areas of your life. The emotions that are experienced in any context might also differ according to this difference in perspective, as was demonstrated in the rating of selection task materials that was presented in chapter five. The identification of this perspective effect has highlighted a gap in research and theory that was not apparent at the start of this project. The *self* versus *other* perspective effect seems likely to be an important feature of the decision context, and it should be investigated in different contexts in future studies to discover how this factor interacts with other features of the decision context.

10.3.3. Rule Adherence and Satisficing

A key element that has been identified in this project is participants' preference for satisficing (e.g., Evans & Over, 2004; Simon, 1959), when looking for evidence of rule violation by another party in the prudential, pragmatic social agreements that were investigated in these studies. This was observed in all conditions that were operationalized in these studies, in *self* and *other* perspective conditions. Rather than searching for evidence that the other party had broken their agreement on one specific occasion, participants seemed keen to present evidence that the other party had kept their agreement on at least one occasion. This was presented as evidence of the other party's good faith, and seemed to satisfy participants that the other party had not broken their agreement (because they had kept it, even if on only one occasion). Mitigating circumstances (e.g., Manktelow et al., 2000) were presented as being important reasons why the other party might not have done as they had agreed on all occasions, and participants were keen to ignore or

reframe evidence that might otherwise be taken as being evidence of rule violation *if* they could demonstrate that the other person had kept their agreement once. Participants were keen to defend the behaviour of friends, partners, or work colleagues in this manner. Within the task, participants perhaps selected information that satisfied their goals. The protection of relationships seemed to be an important goal within the decision contexts that were investigated within these first versions of the new selection tasks.

Although evidence of breaking some rules on one occasion might be sufficient to determine, logically and practically, that the rule had been broken (e.g., in event of theft, or murder), for other rules, people might be more willing to excuse rule breaking if the person who broke the rule had done so for good reasons, or if this behaviour was not generally reflective of how they act. It is perhaps not necessary to follow rules or do as one agreed to on all occasions. However, pointing to the fact that others have broken agreements can result in different benefits and costs. What kind of rule breaking might be excused in what circumstances is an interesting and important empirical question that would have important practical applications. Small thefts, for example within a work setting might be regarded as being justifiable by some people, but this might depend upon what the work setting is, who is breaking the rule, and who is judging whether the behaviour is acceptable. If rules are not regarded as being important, whether they are endorsed by legislation or the product of a more practical goal, they might be more easily broken. The consequences of rule breaking seem likely to be an important factor in this determination; if they are important and costly, it seems likely that the behaviour would be less accepted. Within these new selection tasks, and in the decision contexts presented to participants within them, the participants assumed the other party would have good reasons for behaving as they did; they expected the other party to behave fairly, and rationally, in terms of rationality$_1$.

This kind of behaviour is rational in De Sousa's (2008) account of how emotions can shape behaviour within relationships (see also, e.g., Elster, 2009; Sen, 2009). If the other party were an enemy, or someone whom you have been waiting for a chance

to avenge, or someone whom you simply disliked, you might be eager to turn over the *not-q* card and to expose their failure to do as they had promised. You might also be happy or willing to accept any possible costs associated with doing that; you would have no good relationship to be damaged with those parties in such instances, but your behaving in this manner might damage you if that behaviour was viewed negatively by others with whom you were in important relationships (employers, work colleagues, friends, partners, for example). This possibility might be investigated in future studies.

10.3.4. Oaksford and Chater's Account of Emotion

Emotions were shown to influence participant behaviour in all of the selection tasks conducted in this project, and to do so in ways that interacted with other elements of the decision context. This work has contributed to or understanding of how happiness, anger, and anxiety might influence practical reasoning, and it has done so in a way that presents a challenge to Oaksford and Chater's (e.g., 1994; 1998; 2008) rational analysis of how we might react to threat; the findings obtained here suggest that their account is underspecified. There seems to be less cost associated with the threat-related cards in an anxious or angry state than there is in a happy state, if cost is what determines the selection of cards. More than this, it seems ill conceived to equate responses to complex social decision contexts with more automated responses to snakes and spiders. Anxious and angry participants were more likely to look for threats in the studies presented here, however, the way in which threat was conceptualized by participants was more complex than it had been within Oaksford and Chater's account. Avoidance of threat is only one possible response to threat. Although we might act to avoid some threats, this seems to be not how we respond to other threats, and avoidance is unlikely to be the most adaptive way to respond to threats in many settings. Dealing with a threat might be necessary and to do that we need to attend to it, as has been discussed this thesis. The simple avoidance response that Oaksford and Chater described as our response to threat, presents too thin a model of the information processing studies presented in the opening chapter, which describe our response

to threat. Even spider phobics might focus upon a spider to see where it is, rather than just avoid this kind of threat information. Hypervigilance for threat is not an avoidant response.

10.3.5. Cosmides, and Private Social Contracts

Although it was here much weaker than Cosmides has argued in her social contract theory (e.g., 1998; Cosmides & Tooby, 2000), participants in an anxious state were more likely to look for cheaters. The weakness of this behaviour here, seems to have been heavily influenced by the social settings and relationships within which the social contracts were based. In this respect, the current work has demonstrated that Cosmides account is greatly underspecified in its portrayal of private social contracts. Cosmides (e.g., 1989; Cosmides & Tooby, 2000; 2004) has argued that we should avoid social exchanges in which the cost was higher than the benefit, in order to thrive within a social setting. It has been argued within this thesis that this is not always true. The research studies presented in this thesis, and the development work that was required to construct the new selection task, suggest that Cosmides presented a very partial account of social contracts and our behaviour within these contracts (the focus here being on private social contracts). Cosmides argued that we attempt to maximize utility[42] within the social contract setting by uncovering people who break rules or agreements. According to Cosmides, our *only* danger, which we should seek to avoid, is of being cheated of a desired benefit after satisfying the preconditions or paying the cost required to access this. Cheating was not the most important concern for participants in the new selection task. The appraisal or positioning of costs and benefits, and what you should or might do to acquire them, depends upon the kind of social setting in which you are situated. Even within everyday settings that might fit Cosmides'

[42] This echoes accounts of utility maximization that did not include notions such as satisficing, bounded rationality, information processing limits, subjective utility and probability, which have been added to accounts that define rational human behaviour in terms of utility maximization (e.g., Simon, 1983; Chater & Oaksford, 2008; Oaksford & Chater, 2007).

explanation of exchange behaviour, the presence and influence of multiple emotions have not been explicated within her account – an account which claims to describe behaviour that has been adapted over the course of evolution to function within a social exchange setting. Emotions developed within those same early settings, and they might help us to navigate social exchanges by keeping track of unfolding events, and guiding behaviour within them (e.g., Frith, 2007*a*; 2007*b*; Frith & Frith, 2010; Lefevre & Sirigu, 2017; Rilling & Sanfey, 2011). Different emotions might represent those exchanges differently, by directing attention towards and focusing on different elements of the scene that seem to be of relevance or important, by providing a perspective through which we construe unfolding events and appraise the value of elements within that setting (e.g., de Sousa, 1990; Kappas, 1993; 2001). Emotions might deliver information for action that seems important within that operating state. Representations are partial (e.g., Evans, 2007; Evans & Over, 2013; Johnson-Laird, 1989; 2006; 2020; Kappas, 2001; Oaksford & Chater, 1989; 2007; Sperber, Cara, & Girotto, 2002; Sperber & Wilson, 1995), and emotions provide an important way of navigating in such settings.

According to mental models, information-gain, dual-process, and relevance and goal-based accounts of thinking (e.g., Bonnefon, 2009; Evans & Over, 1996; 2013; Johnson-Laird, 1989; 2006; 2020; Oaksford & Chater, 1989; 2007) people represent and process information by drawing upon expectations and beliefs that seem to be relevant or of value to their goals within the current setting; they determine how to act by attempting to imagine what value that behaviour will have within a given setting, and behaving in a way that is rational in pursuit of their goals. None of these models provide an account of how different emotions function within that process, but in emotion we have a mechanism or process by which relevance and value and importance can be cued, or represented, and one that might direct behaviour[43]. How behaviour might be affected or directed, seems likely to depend

[43] Emotion is not here presented as a complete explanation of behaviour within all settings.

upon what we are doing, and what goals are being actively pursued. Within the selection task, or beyond, we might be attempting to provide evidence that another person is trustworthy and all is well, rather than looking for evidence of cheating. These goals pose different questions, and the cards that might provide supporting evidence for those goals or questions within a selection task differ too.

Emotion can provide a way of detecting, and pursuing information that is relevant to our goals, and they allow a more nuanced understanding of rewards and costs. The definition of relevance that Sperber et al. (e.g., Sperber, Cara & Girotto, 1995; Sperber & Girotto, 2002; Sperber & Wilson, 1995) have proposed as an explanation of selection task behaviour, and inference in general, is not intended here. The linguistic comprehension of relevance intended by a speaker does not provide a sufficient explanation of how relevance is determined within all settings. We might, for example, comprehend and reject another's propositions, or we might interpret their words in line with our beliefs and expectations. What participants are asked to determine within the deontic selection task, is whether someone behaved in a way that violated a rule. Participants are here considering more than words, as they do in many everyday settings; they are thinking about behaviour, and about the consequences of their behaviour in searching for evidence that another person might have violated a rule.

10.3.6. Relationships, Goals and Concerns.

In constructing content for the current versions of the selection task, one concern was to avoid content that might be construed as being unfair, or blameworthy, because these appraisals can lead to anger (e.g., Ortony et al., 1988); deviation from role-based expectations can also evoke anger in others. Fairness was a key concern of participants in the decision contexts that were presented to participants in these first versions of the new selection task. In these, participants seemed to be attempting to manage their relationships with other people. Reputations and friendships have been identified as being important sources of influence on our behaviour within Nozick's account of rationality (e.g., 1993). Nozick has argued that our view of truth can be influenced by our relationships with others, and that

'truth', or our willingness to consider what might be true, can be influenced by the goals that are pursued in different relationships. This might be used to understand participant behaviour within the studies that have been presented here. Participants' drawing upon mitigating circumstances to account for behaviour that might otherwise be regarded as being evidence of rule violation, might be seen in this light. So too might their desire to show that their friends or partners or work colleagues had kept the rule on one occasion, and their suggestion that this demonstrated the good faith of their friends, partners or colleagues. As Nozick argued, there is value in believing that something is true, and there might be value in blindness to faults or deceit, or in this case, evidence of rule violation within social relationships. Behaving in this manner could be understood in terms of the gains that can be provided for us as a result from behaving in this manner – that is, the protection, or nurturing of social relationships from which we might obtain many other gains. There might be little value in behaving suspiciously or in a manner that might expose faults in others within social relationships, within some contexts. These selection tasks might thus be thought about in terms of the value, or costs and benefits associated with believing that another person has broken your agreement, and in terms of the value or costs and benefits associated with finding evidence that your friend, partner or colleague broke an agreement. As discussed above, these benefits might change if we are thinking about or uncovering evidence that someone whom we dislike broke an agreement. This explanation fits with the decision theoretic account of deontic reasoning and decision making provided by Evans and Over (e.g., 2004).

10.3.7. Avoid Overly Simplistic Association Between Goals and Emotion

Goals to nurture, develop and protect relationships might be actively pursued in happy, anxious and angry states. It seems important not to attach goals too readily to one emotion rather than another. It might be more important to understand *how* we might behave when in different emotional states and pursuing what might otherwise be thought of as the same goals. If the behaviour of participants in these selections tasks is thought about in this way, we can see that different emotions might guide our information processing, thinking, choice and behaviour differently.

10.3.8. Moving Beyond Previous Investigations of Emotional Influences on Reasoning

10.3.8.1. Previous Difficulties

Limitations with previous investigations into the influence of emotion on reasoning, were discussed in the opening chapter of this thesis. Two key difficulties were identified with this work. One was the lack of convincing evidence that emotion was evoked by the stimuli intended to evoke emotion in those studies, and therefore that the effects of emotion were being investigated within them. In the studies conducted within this research programme, a great effort was made to construct task content that would be likely to evoke the targeted emotions, so that their effects could be measured within the data obtained from the selection task studies reported herein. Convincing evidence has been reported within this thesis that the materials were effective stimuli to the targeted emotional responses. This effort to induce emotions within the new selection tasks, allowed the investigation of how these emotions influenced participant behaviour in these tasks. Nevertheless, these stimuli designed to evoke specific emotional responses within these studies are not without difficulties, which will be considered further below. The second limitation of previous investigations of the influence of emotions on reasoning was the focus on whether emotions made participants better or worse at reasoning, which was judged against the rules of deductive logic. Although it is perhaps unsurprising given the way in which the old selection tasks were developed and used, and the adherence to normative accounts of reasoning and decision making in previous years (e.g., Oaksford & Chater, 2008), this question provides a very limited way of thinking about how emotions might influence, reasoning, decision making and choice.

10.3.8.2. Moving Forwards: Emotions as Practical Mechanisms.

Emotions have been conceptualized as being important mechanisms that might allow us to act more adaptively within complex, real world decision contexts, in which we have limited information, limited information processing and representation resources (e.g., De Sousa, 1990; Eysenck et al., 2007; Goldie, 2004;

Oaksford & Chater, 1993; Richards et al., 2014; Simon, 1959; Vuilleumier, 2005; Wetherick, 1995; Zeelenberg et al., 2008). This might be particularly true within real world, social contexts in which we need to navigate complex interactions and relationships (e.g., Adolphs, 2009; Frith, 2007; Funder, 1987; Gigerenzer, 1996); emotions can help us to navigate these kinds of contexts. Although the complexities of social communication have been investigated within reasoning (e.g., Hilton, 1995; Sperber et al., 1995; 2001; 2002; Stenning, 2002; Stenning & van Lambalgen, 2004), these social aspects of emotion have not been adequately considered in previous empirical research studies into how emotions influence reasoning. As noted in the opening chapter to this thesis, there is very little account of how emotions influence reasoning within theoretical accounts of reasoning, despite the importance of this subject or influence (e.g., Cosmides & Tooby, 2000; Evans, 2010; Oaksford & Chater, 2008; Simon, 1959).

The research studies that have investigated how emotions influence information processing, which were presented in the opening chapter to this thesis, provide clues as to how emotions might help us to function within complex decision settings. Although these have been conducted within laboratory settings, with participants who completed limited tasks (such as identifying words or dots that are displayed on computer monitors, or reading vignette descriptions of behaviour), there is no reason to expect that our brains will function in a radically different way beyond the laboratory – although here the settings in which we operate might be more complex and busy than they were in the experimental settings, the operation of attentional processes seems to be largely automated (e.g., Richards et al., 2014).

Within the complex decision contexts in which we operate, faced with limited information processing and representation capacities, emotions can provide practical mechanisms that allows us to prioritize resources, and shift focus, and navigate the information processing stream of data that impinges upon our senses at any one time. Emotions signal preferences and allow a weighting or labelling or signalling of data importance. Emotions can guide scarce resources towards information or events that are relevant to our concerns in a given emotional state.

They can direct our attention towards and increase the salience of goal-congruent data, they can activate memories of similar events that happened in the past so that information that *might* help us to navigate current circumstances are available for use. They might help us to predict the behaviour of others so that we can be ready to respond adaptively to what might happen next, and mobilize us to respond in case of emergencies or in the increased motivation to approach or avoid. Emotions can thus help us to function effectively within and adapt to a dynamic, changing world. Considered in this way, emotions might be an important mechanism that helps us to behave rationally in the sense of rationality$_1$ (Evans & Over, 2004). Emotions might help us to achieve our goals. Emotions might help us to form and defend social relationships (e.g., Adolphs, 2009; Averill & Moore, 2000; Blackburn, 1998; De Sousa, 1990), and attend to demands within everyday life. Emotions are thus dynamic.

10.3.8.3. Emotional Intensity and Frequency.

Emotions seem not to be so sensitive that mere sight of a single word, such as *blood*, or *gun*, or *snake*, will evoke an emotional response, as Oaksford and Chater (2008) argued they would (unless the person who sees them is blood or snake phobic, or has experienced a traumatic event that involved a gun). That kind of over sensitivity might prevent us from functioning effectively; too many false alarms might tie up precious attentional resources and interfere with too many other important tasks.

However, emotions need not be intense to influence behaviour, although, as noted earlier within this thesis, emotions can have different effects at different levels of intensity. It would be an error therefore to attempt to overgeneralize current findings and conclude, for example, that happiness or anxiety or anger will always function as they have done in these studies. Further studies will need to be conducted to investigate if the emotions investigated here have similar effects in different decision contexts, in which, for example, the importance of finding evidence of cheating is much greater than it was in these studies, or in which the relationships between the parties who establish prudential agreements are

different than those investigated here (e.g., they might involve employers, or situations in which harm might be caused or avoided by the failure of the other party to do as agreed).

Although emotions might be part of the everyday landscape, as described above, it is important to appreciate the dynamic way in which emotions might be evoked. Many of these issues were discussed in chapters two and three, which provided a consideration of the ways in which emotions might interact with benefits and costs; that understanding was developed during the construction of the new selection tasks, and it represents an important part of this thesis. Without emotions, it is difficult to see how benefits and costs might functions as *real* benefits and costs. As Evans (2014) argued, without emotions, we do not care. In describing emotions as being a part of the dynamic interactive way in which we function within the world, it seems important to repeat the point that we cannot assume that the same emotions will be evoked by stimuli that have evoked those emotions in the past within the same person, or by stimuli that evoke specific emotional responses in others. This issue is considered further below in a discussion of limitations of the current work.

10.3.8.4. Emotions Might Shape Beliefs.

One further aspect of emotion seems important to consider here: emotions might also shape beliefs. A limitation of previous research that has been conducted to assess how emotion influences reasoning or decision making, is that emotion and reasoning or decision-making have been discussed as though they are independent variables. Perhaps this is a product of operationalizing them as factors within an experimental setting, rather than a reflection of any deeper claim about the nature of these entities. Emotion and cognition have been regarded as being separate, independent entities for many years (e.g., Blackburn, 1998). Emotions are not believed to be active influences on all behaviours; many human behaviours are thought to occur in the absence of any emotional influence. It is easy to see, therefore, how emotions and cognition might be regarded as being separate entities. This way of thinking about emotion and behaviour seems to depend upon

an implicit assumption that, within non-clinical populations, emotional influences on cognition and behaviour are typically confined to the temporal context in which they occur, in response to an eliciting object, agent, event or issue. Beliefs are not regarded in this same manner, and neither are memories, which is perhaps understandable as these factors are not conceptualized as being temporary responses to agents, objects or events, which emotions are. Beliefs and memories, which might be thought of as being mental models or representations, are regarded as being essential, pervasive influences on thought, choice, and decision (e.g., Evans, 2007, 2017; Evans & Feeney, 2004; Frijda, Manstead, & Bem, 2000). Beliefs and mental models are also thought to be a major determinant of emotion (see e.g., reviews by Frijda, Manstead, & Bem, 2000; Pham, 2007; Tyng, Amin, Saad & Malik, 2017). In the reverse direction, emotions are thought to have an important influence on the formation and maintenance of at least some of our beliefs, and memories (e.g., Clark & Brissette, 2000; Clore & Gasper, 2000; Forgas, 2000). If emotions have shaped learning, memories and beliefs, it seems possible that emotions can continue to influence our thinking and behaviour long after they first occurred, and that a clear separation between emotion and cognition might not be possible.

10.3.8.5. A Change in the Way Emotions are Understood

The categorical way in which emotions have been considered in this thesis is a little dated; it represents how emotions were thought about at the start of this work, and during the early stages of developing realistic decision contexts that might effectively evoke the targeted emotions (i.e., happiness, or anxiety). The creation of stimuli that might reliably evoke specific emotions is an incredibly difficult task, as has been discussed within this thesis. The belief that it might be possible to construct a realistic social setting that would give rise to only one emotion, now seems slightly naïve. The opening contexts presented to participants in the new tasks perhaps largely achieved that goal by severely limiting the content and focus within them. The conditional agreements and card array items, however, opened up and introduced more concerns to the decision context. The result of that

opening up of the context, was that more than one kind of emotion was evoked. The data presented and discussed within this thesis must be considered in this context. Card selections might be largely driven by the emotion that was targeted within the *within-person* and *within-content* conditions that were operationalized in this research, but they might also be driven by other emotions that were evoked within the tasks (some of which have been discussed above, and in the preceding chapters). As the development of the new selection task progressed, and the task was then used to investigate how emotions might influence participant behaviour, emotion was conceptualized as being a much more dynamic aspect of information processing, representation, and behaviour. Emotion is influenced by context, by the demands that are faced within that context, by the goals that are pursued, by the presence of other people or other animals, and by who those others are, by physical health and tiredness, by norms, by expectations, by learning, past experiences, and by recent and near future events that might influence how we construe and respond to numerous elements that are present within any given setting. This list is not exhaustive, but it gives an idea of the kinds of features that can interact in the evocation of an emotional response.

10.3.8.6. The Need to Measure Emotion

This approach will be reflected in the work going forwards. It will be important to measure in some form, how participants respond emotionally within tasks, if the research is intended to investigate how emotions are influencing thinking, reasoning and decision making. Without that measurement, it will be difficult to develop a more detailed understanding of *how* emotions influence these factors. The task seems daunting. However, as has been shown within the current work, it is possible to identify and control (to some extent) multiple factors that might be expected to influence thinking, decision making and choice, and to do so in a way that allows us to investigate what influence these factors have on information processing and behaviour.

10.3.8.7. A Need to Build More Detailed Models of Emotion and

Previous accounts of how emotions have influenced reasoning have focused upon whether emotion makes us better or worse at reasoning logically. There seems to be an important need to move beyond this old way in thinking about emotion, about whether it makes us more or less logical, or more or less rational. Emotions might make us better or worse at reasoning, and more or less rational, depending upon the nature of the emotional response and the context in which we are functioning at the time. To understand emotions better, we need to begin to map the way in which they influence behaviour in different contexts, so that we can begin to build more detailed models of how they do influence reasoning, decision making and choice. This work makes a start in that direction, future research will be needed to build upon this work.

10.4. Limitations.

The research presented within this thesis is not without flaws, and these have limited what conclusions might be drawn from the work that has been presented within this thesis. In hindsight, the failure to measure emotional responses to task materials in studies two to five, and not to manipulate the background emotional state of participants in these same studies, limited what might be said with confidence about how emotions mapped on to participant card selection patterns. These factors should be measured in future work, to allow a more detailed analysis and understanding of how emotions might have been active within research studies, and how they might have influenced and directed information processing and behaviour. It is clear from the rating tasks that were conducted to validate the new selection task studies, that multiple emotions were evoked within each emotion-as-context-condition – predominantly from the conditional agreements and card array behaviours. Even with the best testing of materials, it seems unlikely that any stimulus would reliably evoke only the targeted emotions. It might have been naïve to imagine that a single kind of emotional response might be evoked within a realistic decision context, in which events unfold over time and people

attempt to negotiate social relationships. A better measure of what emotions are evoked in future research, would allow a better mapping of these elements of the decision context onto behaviours. It might then be possible to build more informative, and realistic models of how emotions influence behaviour in applied settings. One possible limitation of the current research is the attempt to generalize applied contexts to all participants. Although these materials were developed so that they might be familiar, and seem realistic to most if not all participants, this aspect of the research requires further thought. A measure of familiarity, and realism, and perceived likelihood might be useful here. These measures were used in the first selection task, and they provided additional insights into the data. That these measures were not then used in subsequent investigations is a limitation of the current work. It would be useful in future, to attempt to map these measures onto card selection patterns, to see if they might provide important tools for understanding the data. Obtaining participant emotional responses to selection task materials after they had completed the selection task, provided an imperfect way of gathering this data, although that method provided a way of gathering that data without interfering in task performance e.g., Ericsson & Simon, 1980).

10.5. Future Work.

One important area for future research that comes out of this work, is the need for a comprehensive and critical review of how emotions influence reasoning, decision making and choice. This would allow us to begin to build a more comprehensive account of how emotions might influence these behaviours in different decision contexts. The contexts that had been presented in the research should be mapped, so that we can begin to see if there are similar effects across different settings, or if there are currently no clear patterns in the studies that have been conducted to date. The review would need to be critical; it would need to consider how emotion had been operationalized and conceptualized in the different studies. It would need to include a critical consideration of whether there was any evidence

that emotions might have been functioning in the way in which the authors claimed. This is a big project that was beyond the scope of the current research project; it was scoped when conducting this work. There are thousands of studies, and in many there seems to have been little or no attempt to induce emotion in the participants who were taking part in the research studies, and often no measurement of what emotions might have been influencing participant performance in the tasks. The induction and measurement of emotion is a difficult task. However, if we are to improve our understanding of this subject, we need to consider these factors. From this foundation, a more comprehensive account of how emotions might influence reasoning and decision making could be developed.

An additional review also seems important; that of how context influences reasoning and decision making, so that we can begin to incorporate these factors in a more detailed manner within current theoretical accounts of these kinds of information processing. This achievement would make it easier to apply these models to real world decision-making contexts, and thus increase the practical reach of these theoretical accounts. Emotions and perspective might be understood as being features of the context in which we operate, beliefs and instruction effects might be understood as being features of the decision context too. This task is significant and large; this review was also scoped whilst completing the research that has been presented within this thesis, and its completion was beyond the scope of this thesis. The task of drawing boundaries alone presents an onerous challenge, in light of the use of words such as *perspective*, *belief*, *instruction*, *context*, and *content* in ordinary language in empirical studies that have little direct relevance to a bounded review of reasoning and decision making. Truncating these terms so that varieties are not missed (e.g., *belief$*, or *believe$*) increases the size of the task. Adding terms such as *the effect$ of*, or *the influenc$ of*, achieves some limit to the articles that are returned, but to avoid exclusion of important articles within the review, sufficient gaps are needed between this kind of term and its reference, such as *perspective*, for example. This gap then increases by thousands the numbers of articles that are returned in a search of any one database. The review would need to be bounded to make the task achievable within a reasonable

period. This review would also need to be critical, of definitions, and measures, and controls, to provide a useful account of the current state of the art, and to allow us to identify whether there are similar or different effects of these variables in different contexts. Within the review a useful way of joining up findings from what are currently disparate areas might be found, which would increase its practical usefulness.

It might then be possible to determine whether key factors seen to shape information processing and behaviour globally, and whether other features have more local effects. The two reviews would make a significant and important contribution to the field by providing a solid foundation from which further research could be conducted. Searching through thousands of apparently disparate research articles is the task that faces anyone who is attempting to investigate these areas currently. Bringing together what is currently known, identifying what improvements are needed, and what gaps exist, would save a great deal of time, and improve future research endeavours.

The effects of context and content have been the focus of research in many areas beyond conditional reasoning, for example in thought and speech (e.g., Hilton, 1995; Stalnaker, 1999), visual perception (e.g., Todorović, 2010), attention (e.g., Olson, Chun & Allison, 2001), memory (e.g., Bookbinder & Barinerd, 2016), Yee & Thompson-Schill, 2016), motor control (e.g., Foster & Higham, 2014), gambling tasks (e.g., Walasek & stewart, 2019), category judgements (e.g., Barsalou, 1982; 1991), social judgement (e.g., Schwarz & Sudman, 1992), and rationality (e.g., Gigerenzer, 1996). The effects of context and content are therefore not isolated to participant behaviour within the selection task; they are not an artefact of this task, or of participant failure to understand this task, and they need not be understood as a flaw or focused upon in this manner. Context seem to influence most, perhaps all areas of information processing and behaviour, all the way down.

Adapt The New Selection Tasks

The studies presented in this chapter demonstrate clearly that the new selection task can be used to increase our understanding of what factors might influence

ordinary deontic reasoning, about how we might or should behave within personal social contracts, when we are negotiating social arrangements and relationships. In the studies presented in this thesis, there has been clear evidence that participants are reasoning in this task, that they are reasoning about how they might behave in this task, that they are thinking about what the consequences of their behaviour might be when deciding what cards to select, that is, in what to do or how to act in this task. They were thinking about what the consequences might be, of selecting cards, or of finding or not finding evidence of rule breaking by a friend, or partner, or work colleague. In making the selection in this task, they were thinking about how their behaviour, in *their looking* for evidence of rule breaking by the other party, might be construed by others – by the person with whom they made the agreement, but also by other friends or family, or work colleagues (e.g., whether they might be seen as being too demanding, or crazy, or unfair). What they were thinking about in this task, therefore, was how their behaviour, in looking for evidence that the other person did not do as they agreed, might affect their relationship with others.

The new selection tasks could be adapted, so that they modelled real world decision contexts in applied settings. These tasks could then be used to model behaviour in those settings, and to investigate what aspects of context influenced behaviour within them. Applied studies might then be conducted to discover whether the modelled effects provide a way of understanding, predicting and perhaps influencing behaviour in those settings. The work that was devoted to the construction of these tasks has resulted in an enhanced understanding of how to model decision contexts within the task, and how to manipulate factors within those contexts in a controlled manner. Some improvements seem to be needed, not least in terms of how outcomes are measured in the current task. The card array offers a limited means by which behaviour, reasoning and decision making might be assessed. The kinds of questions that are asked might also be developed, to enrich the task and assist with the interpretation of data. These might be based on factors that seem to be important within the applied settings that are modelled within the tasks. They might also be based on important research questions that

have been identified as being in need of further work within those contexts. A way of capturing participant thoughts and emotions during task completion is an important goal of near future research, although care would be needed to minimize the reactivity of the data collection measures (e.g., Ericsson & Simon, 1980).

The way in which emotions are evoked might also be developed: they could be about the task, not about the task, or about the task and not about the task. Goal conflicts might be modelled, as might changes to the benefits and costs attached to different outcomes. Several versions of the new tasks were developed during the process of construction the new selection tasks, which did not work across *emotion- as-context* conditions, and so they were not included in the current programme of work. They could, however, be used to investigate how different elements of context influence thinking, decision making and behaviour. Modelling realistic applied decision contexts offers an exciting route by which this work might be taken forward and used in applied settings.

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Appendix 1. Selection Task Scenarios Presented and Rated in Chapter Four.

Happy Scenario 1: Car Loan and Petrol Exchange.

You've planned to go away for the weekend with friends, for a break. You've been working hard and all of you are looking forward to getting away for time out, to relax, escape work and have fun. Your uncle has a car that hasn't been used much lately because he hasn't been able to drive, and so his car has been sat in his garage and is in need of a good run to keep it in good working order. The car needs petrol. You've booked a weekend stay in a place that's hard to get to using public transport, his car would make the journey much easier and mean you don't have to struggle with heavy bags. It would be great to have car for weekend in case you want to explore when you are there. Your uncle knows about your weekend away, you get on well and have talked about it with him. He tells you about his car needing a good run, so you come to an agreement,

If you fill his car with petrol (p)
he will lend you his car for your weekend away (q)

Happy Scenario 2: Flat Share and Room Exchange.

You have been dating someone for a few months who you like a lot, you have enjoyed being with them. You want find a way of having some time alone with them, which has been impossible before now because there have been friends around when you've been together. You'd really like to have some space alone with them without interruptions, so that you can relax, and enjoy an evening together. You live in a shared flat, and it hasn't been possible to have time alone there. You and your flatmate come to an agreement to give each other the use of the flat on different evenings; you'll give them the flat for the night, if they'll do the same for you. Your flatmate likes to spend their evenings in the flat, they haven't got much money this semester and it's cheaper for them to socialize at home. They also really prefer to relax in a familiar environment where they feel at home, either alone or with a few close friends. However, they're not comfortable around people they don't really know, and they don't know your date at all. You were looking forward

to an early night this evening, but your flatmate knows that you want to invite your date over on Friday evening. They would really like the flat to themselves this evening; they don't know you very well as you haven't been sharing long, and they'd like to have a relaxing night in with a few close friends. so you two come to an agreement,

If you let your flatmate have the flat to themselves this evening (p)
they will let you have the flat to yourself on Friday evening (q)

You can invite your date over to the flat this Friday evening, and you're feeling excited about the prospect of having the place to yourself them.

Happy Scenario 3: Time Off and Work Shift Exchange.

You have a part-time job, which you've been doing to get some money extra money. It's good fun on most days; the work is enjoyable, and your manager is very reasonable. The pay is good too. You have become friends with some of the people you work with and so the time that you are there passes pleasantly enough. The job is easy to get to, and so you don't have hassle travelling to and from work. One of your workmates wants to go out when they're supposed to be working next week, and you would like to change one of your shifts next week too, so that you can get to a party that you thought you wouldn't be able to get to. You'd really like to go to that, so it was a shame that you were supposed to be working when that was happening. When you're chatting during a work break, you arrange between yourselves to swap shifts, so that you can both get the time off you want next week.

If you work their shift on Monday (p)
they'll work your shift on Tuesday (q)

Anxiogenic Scenario 1: Walking Home with a Friend.

You have been out all day, and you are feeling tired; you want to get home and get to bed. The day has passed too quickly, and you didn't manage to finish everything that you wanted to get done. You've had to deal with a lot of interruptions from other people who wanted your help or advice, and you've perhaps been too generous with your time. It's late in the evening, it's dark, and it's raining outside. You're dressed for

the weather, but you're not going to get home without getting wet. You don't have any money for either a taxi home or bus home, and you can't get a lift back this evening. You're going to have to walk home, and you'll have to go through an old, rundown estate, which you've only done twice before when it was light. You set off in the rain. Visibility is quite poor because of the rain. You can hear shouting in the distance – probably people who've been out drinking for the night who are on their way home. You can hear footsteps behind you too, but you can't see who they belong to. You're approaching the old estate, and don't feel keen to make the journey through that alone. There's a bus stop on your left, before the start of the estate, and you stop here to wait for a friend. They have been out for the evening and have agreed to meet you here where they'll get off the bus, so that you can walk home together. They live very near to you, and they didn't want to walk home alone at this time of the night. They'll have to come home a bit earlier than planned, but they were pleased that you would be walking home that way this evening. When you spoke earlier today, you had come to the following agreement

If you wait for them at the bus stop just before the old estate (p),

they will meet you there and walk back home with you (q)

Anxiogenic Scenario 2: Working Hours and Module Grades.

Your exam results are being released later today; you seem to have been waiting for these for ages. You're not sure how you did in these last exams. The questions were a bit tricky and you're not sure that you answered the questions properly. You've heard other people talking about the exam questions, and they seem to have given different answers than you. You thought that your answers were okay, so perhaps the grades will be fine, but you ran out of time in most of the exams, and couldn't remember everything that you wanted to include. You've been up for hours, because you couldn't sleep last night, and now you're feeling a bit tired. You had arranged to get something to eat with a friend, before the results come out, but you're not hungry now. It's hard to sit still, or to focus on other things, but you're hoping that you'll feel better when you know what marks you got this semester. Your parents have been on the phone to you this morning, wanting to know when

you'll get the results. This has made you feel more tense than you were already. As a surprise, your parents have decided to pay for a holiday for you, if you do well in the exams. When they rang this morning, they told you that

If you get your predicted grades in the exams (p),

they will pay for you to go on holiday next month (q)

Anxiogenic Scenario 3: Exam Results and a Holiday.

The past few months have been a bit tense. One of the things that has contributed to this is that you've been struggling with one of your modules at university, although other things have felt more difficult too. You have attended all the lectures for that module, and you've been going through the work with some of your course mates who seem to understand it better than you do. That has helped you to understand the work better than you did when studying alone. You've found some books that help too; the way that they've been written makes it easier to understand the things that are included in the module. The rest of your course seems to be going well; you've been getting good grades in most of your work and so you're reasonably happy about that. You are concerned about this module though; you don't want a poor grade in this module to drag down your overall mark for the year. The module is double-weighted. So you arrange a meeting with the module tutor to talk about what you can do to pick up your grade. You explain to him what work you've been doing and how you're feeling about the course. Your tutor tells you that there is a simple rule that you can follow when planning your work schedule

If you put in the required work for the module (p),

Your mark for this module won't pull down your overall mark for the year (q)

Neutral Scenario 1: Turn Taking and House Chores.

You've moved in to a shared house, with three friends. The rent is reasonable, the house is close to university and the local shops, and so it will be convenient living here. You haven't lived together before, but you get on with each other, and you hope you'll get on as housemates. The rooms are clean, and you all have rooms

that you wanted when moving in. You have a rota for house chores, and you take turns with these so that the system is fair. You're going to be away for a week next month, and so you won't be able to do your chores that week. You don't feel as though you can leave your friends to do them for you, and don't want to cause friction in the house. So, you ask one of your friends if they'll do your chores for you when you're away, if you do something in return for them. They're not keen on housework, so they suggest that you can swap chores on the rota, so that they don't have to do any more than they do already. You come to the following agreement

If I do you all of your chores next week (p),
You'll do all of my chores for the week when I'm away (q)

Neutral Scenario 2: Milk Loan and Return

You are living in shared accommodation, and you have some milk in your fridge. It's late evening, and this is the only milk in your house. Some friends have called in after a night out and want to use your milk to make drinks. You don't have enough milk for breakfast anyway, before they use the milk, and you were going to buy some in the morning. To save you from needing to do this, you come to an agreement with them;

If they use your milk this evening (p)
They must replace it early tomorrow morning, so that you have milk for your breakfast (q)

Neutral Scenario 3: Shopping, Unloading and Putting Away.

You are living in shared accommodation with friends, and you and a friend have run out of food; you are going to get a lift to the shop to get some new supplies. Your friend wants to stay at home rather than go shopping this morning – they find shopping a bit of a chore. You were willing to get the shopping, but don't want to do all the work. You want to go out after getting home with the shopping. So, you came to an agreement:

If you get the shopping (p)
they must unload the shopping and put it away when you bring it home (q)

Appendix 2. Selection Task Scenarios Presented and Rated in Chapter Five.

Restaurant: Anxiogenic. Rule Adherence Benefit.

I'm in an unfamiliar and expensive restaurant, feeling on edge about the night ahead and waiting for my date to arrive for dinner: it's taken me months to pluck up the courage to ask him out. He's absolutely gorgeous and I can't believe he can really be interested in me; I desperately want to impress him tonight. He arrives in the bar and several other diners greet him very warmly; he's seems to talk to them for ages before coming over to where I'm standing. He tells me that his best friends are eating here this evening and that they've invited us to join them for a drink before dinner; I don't want to seem unfriendly, so I say that we should join them for a drink. I'm feeling rather underdressed as I sit at the table with his friends; he seems to be enjoying the easy conversation with them but I can't think of anything to say so I stare at the drinks menu.

His friends are discussing the pros and cons of particular vintages from different vineyards, and one of his friends, Vanessa, is being very familiar and flirtatious with him. My date asks me if I'll choose something from the wine list for us to enjoy before our meal. I can't recognize any names on the list but then I see something that I hope might impress. I really want to spend some time alone with him this evening and I know that he wants to take me to his favourite club after dinner, so I agree to the following ground rule:

Restaurant: Happy. Rule Adherence Benefit.

I'm sitting in a fabulous restaurant, waiting for my date to arrive for dinner; he's absolutely gorgeous and I'm delighted that he's coming this evening; I can't wait for him to arrive. I want to treat us tonight, which is why I've chosen this restaurant for dinner, and I'm feeling excited about the night ahead. He walks in to the bar and several other diners greet him warmly; he spends a few minutes with them but it's me he's watching whilst he's talking to them. He walks towards me slowly and kisses me. He tells me that his best friends are eating here this evening and have invited us to join them for a drink before dinner; I say that one drink with them

sounds good. He warns me that Vanessa is a bit smitten with him, and suggests that we excuse ourselves if she becomes too much.

His friends are easy to talk to and he and I are talking easily with one another; he makes me laugh and I feel very comfortable with him. There's definite chemistry between us and I'm feeling more attracted to him than ever. He says that he's not sure what to drink before our meal and he doesn't recognize anything on the wine list; I've seen something that I think he'll enjoy and think he'll be impressed with my choice. I want to spend some time alone with him this evening and I know that he really wants to take me to his favourite club after dinner, so he and I agree to the following ground rule:

Restaurant: Neutral-Low-Mixed. Rule Adherence Benefit.

I'm waiting in a restaurant for someone I've known for a while, we've only recently started socializing and we've both been a little busy lately so I haven't seen him for a few weeks. I want to relax this evening, so I've chosen a fairly quiet restaurant for dinner. He arrives in the bar and several other diners greet him; he waves hello to me and spends a few minutes talking to them before coming over to where I'm stood. He tells me that a few of his friends are eating here this evening and have invited us to join them for a drink before dinner; I say that one drink with them sounds good and we join them at their table.

My friend asks me if I'll choose some wine for us to have before our meal because he's not sure what to chose; I don't recognize many names but I've seen something on the wine list that I think he'll enjoy. Vanessa is trying to impress us all with her knowledge of wine and I feel as though she's trying to compete with me for the attention of my friend. I want to spend the evening with him and I know that he wants to take me to his favourite club after dinner; it tends to be quiet in there and I want to get away from the restaurant early so he and I agree to the following ground rule:

Conditional and Card Array for Restaurant Scenario:

If I agree to come to his favourite club after dinner (p),
then he must choose which wine we'll have before our meal (q)

p	I agree to come to his favourite club after dinner
¬*p*	I take him to a local cafe when we've finished dinner
q	He chooses which wine we'll have before our meal
¬*q*	He lets Vanessa choose which wine we'll have before our meal

Coursework: Anxiogenic. Rule Adherence Benefit.

I've been struggling with one of my modules and I'm dreading the assessment; I don't see how I'm going to scrape a pass in this one and the essay deadline is looming. I haven't got the time I need to put in to this to understand it and I can't afford to fail this. The lectures for this subject have made no sense; I don't even understand what I'm supposed to be doing. I've been told that it's absolutely vital to master this subject, as it provides the foundation for all other modules across my degree programme. If I can't understand this now, I'm worried that I might not make it through next year. There's one girl in my group who's good at this module; several students have said she can explain this so that it makes sense.

I haven't spoken to her much because I feel a bit inadequate in her company, but apparently she's not keen on one of the modules that I've done my essay for already. I find her in the library and she nods in my direction. I really need help with this essay but I'm feeling anxious about hassling her because I don't want an embarrassing scene. I've got quite a good reputation at university and don't want to endanger this; I know that this girl is popular and well thought of and really don't want people to think I'm unreliable. I decide to ask if she'll help me out and walk up to her. She's a bit quiet but she seems OK and she and I agree to the following ground rule:

Coursework: Happy. Rule Adherence Benefit.

I've been working well this academic year, although I haven't been working at full

stretch because I've been out enjoying my social life. I'm really hoping to come out of this year with some firsts, because I've been promised a big reward if I achieve this. My tutors have said that if I continue working at my present standard it seems likely that I'll achieve this. I'm hoping to get good marks in an essay for which the deadline is approaching. A good grade in this should give me an advantage across the rest of my degree programme, because it provides a foundation for all other modules. There's one girl in my group who seems good at this module; I haven't spoken to her much but she seems friendly.

Apparently she hates doing one of the modules that I can do easily and I've already written my essay for this. It would be easy to help her out with this and it wouldn't take much of my time. I haven't spent much time on my essay yet, but I'd really appreciate her thoughts on this. I know that she's popular and well thought of and don't want people to think I'm unreliable; I've got quite a good reputation at university and don't want to endanger this. I see her in the refectory and she smiles in my direction so I decide to ask if she'll help me out. She seems quite happy about the thought of teaming up, so she and I agree to the following ground rule:

Coursework: Neutral-Low-Mixed. Rule Adherence Benefit.

I've been doing OK this academic year, although I haven't been working at full stretch because I've felt fairly relaxed about work. I find my lectures manageable enough, and I understand my modules without too much work. One of my modules is a bit boring but I should do OK in this; a basic understanding of this area will help me through the rest of my degree programme, because this provides a foundation for all other modules. There's one girl in my group who's quite good at this module; she does quite well in most modules although apparently she's less keen on one of them that I've covered pretty much already; it wasn't particularly thrilling but I think I've done what was needed for this and I've written the assessed essay.

It would be fairly easy for me to help her out with her essay and it wouldn't take much of my time. I wouldn't say no to some help with mine; it would save me from trawling through the work needed for this and free up time for other things. I know that this student is popular and well thought of and don't want people to think I'm

unreliable; I've got a good reputation at university and don't want to endanger this. I see her in the refectory; she nods in my direction and I ask if she'll help me out. She seems okay about the thought of teaming up, so she and I agree to the following ground rule:

Conditional and Card Array for Coursework Scenario

If I help her with her essay (p),
then she must spend time with me working on my essay (q)

q	She spends time with me working on my essay
¬*q*	I write my essay alone
p	I help her with her essay
¬*p*	She works through her essay without any input from me

Lodge: Happy. Rule Adherence Benefit.

I've just entered Manor Lodge: my holiday home for the next week for me and three of my best friends. The lodge is fabulously luxurious; we each have our own rooms with ensuite bathrooms, and the living and dining areas look like something out of House & Garden. The kitchen is stocked with some fabulous food and there's a huge wine cellar beneath the kitchen that will keep us more than happily supplied during our stay. The lodge stands on the banks of Loch Ness, which I can see from the breakfast room. I'm surrounded by spectacular landscaped grounds, and to my right I can see the woodland that offers an exciting shortcut to the local bars and restaurants.

The weather is gloriously warm, and I can feel a refreshing breeze coming across the Loch as I explore the gardens with a pre-lunch drink. It's hard to believe that we've managed to find somewhere so fantastic to stay, and that we've got it for a whole week. I'm wondering what to do for dinner this evening. I really want to raid the kitchen; there's some of my favourite food in there and I'm feeling tired from the journey. Two of my friends are happy either way, but one wants to dine out this evening; apparently the local restaurant chef has three Michelin stars and I've been given a stash of spending money for my trip. We'd all like to have dinner together

whilst we're here, so in order to keep us all happy she and I agree to the following ground rule:

Lodge: Anxiogenic. Rule Adherence Benefit.

I've just entered Manor Lodge: home for the next week for me and three others who've followed me inside in silence. We're here for an assessment. The lodge is dingy and the air smells stale: the living and dining areas look and feel as though they haven't been inhabited for years. In the kitchen I find mould growing around the window frames; the whole place feels grimy. I can see a cellar door in the kitchen but decide not to investigate because there's a nasty smell creeping up the stairs. I walk up to the first floor and find only one bedroom; I'm dreading this week. From the window I can see a river that's heavily shaded by overhanging trees. The lodge is surrounded by overgrown gardens, and to my right I can see the dense woodland that provides my only route to the local village.

I go downstairs and feel a chilling breeze coming across the river as I leave the building to get some air. My three housemates join me outside and we discuss awkwardly what we're going to do for dinner. I want to eat here tonight; I've got some food that we can share and I really don't want trek through the woods because it's dark and I'm tired. Two of my housemates have no preference, but one wants to dine out because this place is a bit creepy and she wants us all to have dinner together whilst we're here. Tonight, in order to keep the peace, she and I agree to the following ground rule:

Lodge: Neutral-Low-Mixed. Rule Adherence Benefit.

I've just entered an old lodge: home for the weekend for me and three others who've followed me inside; we're working together this weekend. The lodge is very basic and the air smells clean, although the place looks and feels as though it hasn't been inhabited for a while. In the kitchen I find a few tins of food, and there's some bread and milk in the fridge. Beneath the kitchen I find a small stone cellar, but there are no supplies down here. I carry my bag upstairs and find my bed in a small room; the whole place feels a bit flat and sparse really. From the window I can see a

small river that's shaded by trees. The lodge is surrounded by several acres of overgrown gardens, and to my right I can see the woodland that provides a shortcut to the local village.

I go downstairs and leave the building to get some air. I'm wondering what we're going to do here when the others join me outside, and we discuss what we're going to do for dinner. I want to stay in because I'm tired and don't really want to trek through the woods to an expensive restaurant. Two of the others have no preference, but one wants to eat out this evening; she thinks it might be a bit dreary staying in and we'd all like to have dinner together whilst we're here. Tonight, in order to keep us all happy, she and I agree to the following ground rule:

Conditional and Card Array Items for Lodge Scenario.

If I dine with them at the restaurant this evening (p),
then she must dine with us at the lodge tomorrow night (q)

q	She has dinner at the lodge with us tomorrow night
¬*q*	She has dinner at the restaurant tomorrow night
p	We all dine at the restaurant this evening
¬*p*	We have dinner at the lodge this evening

Travel to Airport: Happy. Rule Adherence Benefit.

I'm running down the road and my heart is pounding. I'm feeling incredibly excited about the week that I can feel stretched out before me; I've been given a holiday in Singapore with my best friend as a reward for working well this year, and I'm on my way to the train and I'm thinking about our holiday. We'll be travelling Upper Class - the absolute height of indulgence and luxury. On the plane we'll have our own private area, and a superb choice of food and wine. I've been looking forward to this holiday for weeks. In Singapore we're staying right in the heart of the Lion City: a thriving district that offers adventure night and day. I'm thinking about going on the night safari that we can travel through by tram, and to Sentosa: an island that offers golden beaches, sunshine, restaurants and clubs.

I spoke to my friend before setting off to tell her I was on my way. I rang her last

night to ask if she wanted to travel to the airport with me, but I can get delayed and we wanted to make sure that we both made it to the airport on time. I can get a lift to the airport if I'm running late but she needs to catch the noon train to get to the airport on time, and so she and I agreed to the following ground rule:

Travel to Airport: Anxiogenic. Rule Adherence Benefit.

I'm running down the road and I can feel my heart pounding. I'm feeling tense about the week that I can feel stretched out before me; I've taken out a loan that I can't really afford to pay for a holiday in Singapore with a friend. I'm on my way to the train that will take me to the airport; I'm cutting it fine and am worried that I'm going to miss the flight. I've no money for food and I'm wondering how long I'll have to wait before dinner on the plane. I'm wishing that my bag wasn't so heavy and as I run I'm thinking about my trip. We're staying in the heart of a busy industrial district that offers cheap accommodation. I'm trying to work out how I'm going to afford the trips that my friend wants to book, like the journey to Sentosa: an island populated with expensive restaurants and clubs.

I was nervous about this trip last night and I couldn't get to sleep for hours. I rang my friend yesterday to see if she was going to get the train to the airport with me, but I can get delayed and we wanted to make sure that we both made it to the airport on time. I can get a lift to the airport if I'm running late but she needs to catch the noon train to catch the flight, and so she and I agreed to the following ground rule:

Travel to Airport: Neutral-Low-Mixed. Rule Adherence Benefit.

I'm walking down the road thinking about the weekend ahead of me; I've been saving so that I can afford some time away with one of my friends and I'm on my way to the station. I'm relieved that my bag isn't too heavy, and I'm feeling a bit hungry but I'll have to wait for the meal on the plane because I have no spare cash on me. As I walk I'm thinking about our break but I'm feeling a bit lethargic. We're going to stay in a Scottish town that claims to offer something to do at all hours of the night and day, but I'm wondering whether I'll have the energy or inclination to

explore what's on offer, such as the trip to an area of the coast that boasts of busy beaches and restaurants.

I spoke to my friend before setting off to tell her that I was on my way. I rang her last night to ask if she was going to travel to the airport with me, but I can get delayed and we wanted to make sure that we both made it to the airport on time. I could easily get a lift to the airport if I'm running late but she needs to catch the noon train to give her plenty of time, and so she and I agreed to the following ground rule:

Conditional and Card Array for Travel to Airport.

If I agree to travel with her to the airport (p),
then she must leave without me if I'm not at the station by noon (q)

p	I agrees to travel with her to the airport
¬*p*	I tell her that I'll make my own way to the airport
q	I'm not at the station so she leaves without me at noon
¬*q*	She waits for me until 12.30 pm

Boat Deck: Happy. Rule Adherence Benefit.

I'm with one of my best friends on the deck of a passenger cruiser, about to set off for a day's sailing around the Greek coastline. There are few other passengers onboard as I sink into a deck chair to enjoy my drink in the warm morning air. The sea looks calm and blue as I look out toward the horizon; I can hear the engine purring softly and gulls calling as they circle over the sea, waiting for the catch that will be churned up in our wake as we leave the harbour. I'm feeling excited about the day ahead and I'm wondering if we should get off and explore the coastline before lunching onboard, when our boat docks in a private bay along the coast, or whether we should explore after we've enjoyed lunch.

I'm feeling eager to set off and decide to explore the boat so that I can do something with my surplus energy. Before I enter the bar I see that more people are waiting to board; the top deck is going to be filling up and my friend desperately wants to sit up there before lunch. There's a small sundeck at the front of the boat with a few

exclusive seats for relaxing during the cruise. I call to my friend from the bar and tell her that I'm going up to the sundeck to grab some seats; we haven't seen each other for ages and I've been looking forward to today so much because I'm going to be spending it with her. She calls back to me from the across the deck and we agree to the following ground rule:

Boat Deck: Anxiogenic. Rule Adherence Benefit.

I'm with one of my best friends on the deck of a passenger cruiser, about to set off for a day's sailing around the Greek coastline. I'm feeling tense about the day ahead. There are several other passengers onboard as I stand on the deck in the cool morning air. The sea looks choppy; I can hear the engine rumbling noisily and some gulls calling as they circle overhead, waiting for the catch that will be churned up in our wake as we leave the harbour. I'm wondering if we should get off the boat before lunch, when our boat docks in a bay along the coast, or whether we should stay on the boat for the duration. There's a man standing not far behind us who's been watching my friend for most of the morning; he followed us from the café where she and I had breakfast this morning.

I'm feeling restless and decide to explore the deck so that I can do something with my nervous energy. From the left side of the boat I see that more people are waiting to board; the top deck is going to be filling up and I really want to sit up there during the cruise before lunch; there's a small sundeck on the top deck that I saw when we were looking through the brochures. I call to my friend and tell her that I'm going up to the sundeck to grab some seats for the journey. I don't want to miss the seats but I don't want to leave her alone for too long on the boat with that guy hanging around, so we agree to the following ground rule:

Boat Deck: Neutral-Low-Mixed. Rule Adherence Benefit.

I'm with a friend on the deck of a passenger boat, waiting to set off for a short trip around the coastline. There are few other passengers milling about as I stand on the deck in the cold morning air. The sea looks a bit grey but it seems calm enough as I look out over the railings; I can hear the engine running and the sound of birds

calling as they wait for the catch that will be churned up as we leave the harbour. I'm thinking about the day ahead and wondering if we should have a wander about on land before lunch, when our boat docks along the coast sometime after noon, or whether we should go for a wander after we've had lunch.

I'm feeling a bit tired and decide to explore the boat so that I'll have something to keep me occupied for the next half hour or so before setting off. Before I enter the bar I can see that more people are standing waiting to board; the top deck is going to be filling up and I want to sit up there before lunch. There's a small sundeck at the front of the boat with some seats that provide a good view of the sea and coastline. I call to my friend from the bar and tell her that I'm going up to the top deck to get some seats; we haven't seen much of each other lately and I've been looking forward to today because we're going to be spending some time together. She calls back to me from across the deck and we agree to the following ground rule:

Conditional and Card Array for the Ferry Scenario

If I go up and find us a seat (p),

then she must follow me up to the sundeck (q)

p	I go up and find us a seat on the sundeck
¬*p*	I stay in the bar
q	She follows me up to the sundeck
¬*q*	She stays on the lower deck

Sledging: Happy. Rule Adherence Benefit.

I'm flying down the slope at great speed on a sledge and my girlfriend overtakes me; she's cheering loudly and laughing at me for being so slow; we're in Italy for a couple of weeks to have a break from uni and the weather is absolutely glorious. I can feel the wind blowing through my hair as I head down the slope behind her. My face feels warm in the sun and I shut my eyes for a few seconds to enjoy this feeling; at this moment I think I could stay here forever. We've been here for four days and every one of them has been amazing. As I'm coming past a clump of trees

on my right, I'm pelted with snowballs; I can see my girlfriend now on the edge of the trees with a huge grin on her face.

I break sharply and set off after her through the trees; I catch her easily and she falls to the ground with me. After a bit of a tussle, she relinquishes and promises not to throw any more snowballs for the next hour. I love being with her; she's such good fun and she looks absolutely irresistible. It's getting late and we're feeling in need of dinner so we walk back through the trees together. I tell her that I think I need some serious looking after in order to make up for all her teasing; I don't tell her that I've found a fabulous restaurant over to left on this hillside or that I've booked us a table for diner as a surprise present, so for the journey downhill she and I agree to the following ground rule:

Sledging: Anxiogenic. Rule Adherence Benefit.

I'm flying down the slope at great speed on a sledge and my girlfriend overtakes me; she's shouting loudly and sounds really terrified; we're in Italy for a couple of weeks to have a break from uni but it's turning into a nightmare holiday. I can hear the wind howling through my hair as I head down the slope behind her. My face feels as though it's burning in this icy air. I shut my eyes for a few seconds and wish that this wasn't happening; at this moment I think I'd rather be anywhere but here. We've been here for four days and every one of them has been a disaster. As I'm coming past a clump of trees on my right, I'm pelted with snowballs; I can see my girlfriend now on the edge of the trees and she doesn't look happy.

I break sharply and set off after her through the trees; I catch her easily but she tries to push me away and we fall to the ground in the struggle. After a bit of a tussle she relinquishes and promises not to throw any more snowballs for the next hour. I'm not enjoying being with her; I don't know what's wrong but she's being really moody. It's starting to get dark so we walk back through the trees together and I'm worrying about her going off on her own without me. I spent most of last night searching for her and worrying that something awful might have happened. We're staying with her brother and I really can't face returning without her this evening, so for the journey downhill she and I agree to the following ground rule:

Sledging: Neutral-Low-Mixed. Rule Adherence Benefit.

I'm coming down the hill on a sledge and my friend overtakes me; she's looking at her watch and asking what's keeping me; we've come out to get a break from uni for the day and the weather is surprisingly mild; it's been snowing for a couple of days and there's just about enough for sledging. I can feel a breeze blowing through my hair as I head down the slope behind her. My face feels a bit warm from the wind and I shut my eyes for a few seconds to pretend that I'm somewhere else entirely but I can't quite imagine it. We've been here for four hours and I'm feeling a bit chilly. As I'm coming past a clump of trees on my right, I'm pelted with snowballs; I can see my friend now on the edge of the trees grinning stupidly.

I break and head off after her through the trees; I catch her easily and she falls over when I tackle her. After a bit of a tussle, she relinquishes and promises not to throw any more snowballs for the next hour. I usually enjoy spending time with her but she's in a bit of a strange mood today. It's getting late and we're feeling in need of dinner so we walk back through the trees. I tell her that I'm feeling a bit rough although it's probably nothing serious, so we decide to sledge to the bottom at a steady pace. She knows that I felt a bit weird yesterday, so she and I agree to the following ground rule:

Conditional and Card Array for Sledging Scenario

If I fall off my sledge (p),
then she must come back and find me (q)

p	I fall off my sledge
¬*p*	I get off the hill without falling
q	She comes back and finds me
¬*q*	She runs on ahead without me

Driving: Anxiogenic. Rule Adherence Benefit.

I'm being driven along a dual carriageway by my girlfriend and I'm feeling incredibly tense. Heavy rain is bouncing off the windscreen; we've got the window open to

get some fresh air, it's freezing cold and it's dark. We're being dazzled by the lights of oncoming traffic which is travelling way too fast. Water is pouring down the roadside and there are patches of black ice on the ground. We've been out this evening celebrating her birthday, which I'd forgotten about until she reminded me, and she's gone silent. I think she's almost crying as we're driving along and I wish this evening would come to an end; I'm sitting here hoping that we'll pull over soon.

We come into a sharp bend and the car goes into a heavy skid; there's no room in our lane to pull out of it and we swerve into the oncoming lane. She screams at me when I try and take control of the wheel. I can hardly bear to watch; there's a heavy lorry driving towards us at speed and we narrowly miss a head-on collision with it. She pulls the car over onto the side of the road and we sit here in silence. After what feels like an eternity I ask her what she wants to do now; she asks if I'll come home with her so that we can have a better end to the night. I don't want her to drive any further tonight; she's upset and she's feeling very tired: she's been feeling like this for the past few days, so she and I agree to the following ground rule for the next few weeks:

Driving: Happy. Rule Adherence Benefit.

I'm being driven along a dual carriageway by my girlfriend and I'm feeling incredibly excited. We've got the windows open to get some fresh air; it's a beautiful evening and the last rays of the sun are still visible in the sky. There isn't much traffic on the road and she's driving amazingly; she looks incredibly sexy. We've been out this evening celebrating her birthday, which I'd planned for last month, and she's delighted with me. She looks really happy as we're driving along and I want her to stop the car and kiss me but she's pretending that she's not listening to me. I don't want this evening to come to an end and I'm sitting here hoping that we'll pull over soon.

We come into a sharp bend and the car goes into a slight skid; she's a fabulous driver and there's plenty of room to pull out of it as she rounds the bend. She

laughs and screams at me when I pretend to try and take control of the wheel and I sit here with my hands over my eyes as though I can't bear to watch. She pulls the car over onto the side of the road and leans over towards me. I ask her what she wants to do now and she asks if I'll come home with her so that we can have a good end to the night. I was hoping that we might go back to my place but I really want a go at driving this fabulous car and she looks a little tired. I tell her that if she really wants to please me, she'll let me drive, and so she and I agree to the following ground rule for the next few weeks:

Driving: Neutral-Low-Mixed. Rule Adherence Benefit.

I'm being driven along a dual carriageway by my girlfriend and I'm feeling quite relaxed. I can see the evening sky through the windscreen; we've got the windows open to get some fresh air into the car and I can feel a cool breeze on my cheeks. There isn't much traffic on the road and she's driving steadily. We've been to a new bar this evening to have a change ōf scene; we thought it would be nice to go somewhere different and it's been a good night. She looks happy enough as we're driving along but she looks a bit tired and I feel as though she's only half listening to me. I don't really want this evening to end too soon but I'm sitting here hoping that we'll pull over soon.

We come into a bend and the car goes into a slight skid; she's a good driver and there's plenty of room to pull out of it as she rounds the bend. She laughs and pushes me away when I pretend to try and take control of the wheel, and she pulls the car over onto the side of the road to stop for a rest. I ask her what she wants to do now and she asks if I'll come home with her to round off the evening; she's yawning slightly and is feeling a bit tired: she's been feeling like this for the past few days. I was hoping that we might go back to my place, but I've been hoping for a chance to drive and so she and I agree to the following ground rule for the next few weeks:

Conditional and Card Array for Driving Scenario

If I come home with her after a night out (p),

then she must let me drive us back to her place (q)

p	I come home with her this evening
¬*p*	I tell her that I want to get back to my place
q	She lets me drive us to her place
¬*q*	She drives us back to her place

Leave: Happy. Rule Adherence Benefit.

I'm running down the hallway in my girlfriend's house, feeling incredibly excited and laughing; she's chasing after me and I can hear her laughter behind me. We've been having a pillow fight and I'm trying to get out of here before she gets to the door. As I get to the top of the stairs she catches up with me and takes hold of my waist. I stay in her arms for a few minutes, but manage to wriggle free when she's not expecting me to escape and head down the stairs with her following closely behind me. She's begging me not to leave just yet and telling me that she wants to make up for teasing me so mercilessly.

I've had a fantastic morning but I desperately want to go out. I'm thinking about how long it will take me to get back to my place and wondering what's waiting for me there. One of my flatmates telephoned me half an hour ago to tell me that I had to get back to the flat immediately; something has been delivered for me. Apparently it's massive and unbelievably fantastic but he won't tell me what it is. He asked me who I knew who was loaded and what I've been doing recently to earn such a present; I can't wait to get there and find out what it is. As I'm almost at the door my girlfriend jumps in front of me; she asks if I'll promise to come back this afternoon so that we can carry on where we left off, and we agree to the following ground rule:

Leave: Anxiogenic. Rule Adherence Benefit.

I'm running down the hallway in a friend's house, feeling incredibly alone and stressed. I can hear her breathing heavily as my friend runs after me down the hallway. I was expecting her to be alone so that we could talk because I need help desperately, but when she opened his door I could see two police officers in the

hallway. I'm certain that they're talking about my phone call. As I get to the top of the stairs, she catches up with me and takes hold of my waist. I stand rigid for a few seconds, but manage to break free of her grasp when she's not expecting me to escape and head down the stairs with her following behind me. She's begging me not to leave and telling me that she wants to explain everything.

I desperately want to get out of here; I need some space to think and I'm feeling trapped. I'm wondering how long it will take me to get back to my place and what my friend was doing in there; I'd telephoned her an hour ago to ask if I could come over to her flat to talk about something incredibly awful that's happened, because I'm going out of my mind with worry. I'm wishing that I hadn't phoned her or said anything. As I'm almost at the door she jumps in front of me and asks if I'll promise to come back in an hour when the police have gone so that we can talk properly, and we agree to the following ground rule:

Leave: Neutral-Low-Mixed. Rule Adherence Benefit.

I'm running down the hallway in my friend's house, feeling relaxed and happy; she's running after me and I can hear her flat feet on the carpet. We've been having a late session and I'm trying to get out of here before she gets to the door. I'm feeling a bit sleepy and I want to get back to my place. As I get to the top of the stairs she catches up with me and takes hold of my shoulder. I pause for a minute but decide to get out and head down the stairs with her following behind me. I can hear her saying that we ought to have another drink and that she's got some more supplies in the kitchen.

I've had a great night but I want to get home. I'm thinking about how long it will take me to get back to mine and wondering what's waiting for me there. One of my flatmates telephoned me half an hour ago to tell me that something has been delivered for me. Apparently it's heavy but he can't tell what it is. I'm not expecting anything, and I'm wondering whether I've ordered something and forgotten about it. As I'm almost at the door my friend jumps in front of me and asks me where I'm going; she's had a bit too much to drink and is feeling sentimental. She asks if I'll promise to come back in a day or two so that we can have another session, and we

agree to the following ground rule:

Conditional and Card Array for Leave Scenario

If I say yes (p),

then she must let me leave now (q)

p	I say yes
¬*p*	I say nothing
q	She lets me leave now
¬*q*	She blocks the door so that I can't leave

Train Platform: Happy. Rule Adherence Benefit.

My train is not far from the station; I'm meeting my girlfriend and I'm trying to decide when I'm going to tell her the fantastic news; a letter arrived for her this morning and I opened it to get the results of her interview. She's got her dream job that she's been so desperately hoping for and it means that she won't have to move. She went home a few days ago to spend some time with her parents who've invited me over for a meal. I had to stay behind to finish some work but I've got the whole weekend off and I'm looking forward to it tremendously; I've missed her desperately whilst she's been away and I can't wait to see her face.

I'm feeling excited about arriving and wishing that she was with me now; I'm travelling through rush hour but the train is surprisingly empty and I'm hovering on the edge of my seat with my bag ready, feeling great about life and impatient to get off. I ring her to tell her that I'm on my way and she's saying how important this is to her; she's really grateful that I'm coming all this way. I've known her parents for years and have spent many happy hours as the guest of their hospitality, but I'm really hoping to have some time alone with her so that I can tell her the news before joining her parents. I tell her that I'm running a little early and that I can't wait to see her and we agree to the following ground rule:

Train Platform: Anxiogenic. Rule Adherence Benefit.

My train is not far from the station; I'm meeting my girlfriend and I'm trying to

work out how I'm going to tell her the bad news; a letter arrived for her this morning and I opened it to get the results of her tests. She's got to go into theatre tomorrow for an operation to remove a growth in her brain. She went home a few days ago to spend some time with her parents and I had to stay behind to finish an essay; I've got a stack of work to get through and I'm running out of time but I miss her and she's invited me over to meet her parents for dinner. They've asked to meet me so that they can see what sort of person I am; they seem to be quite particular about who she spends her time with.

I'm feeling anxious about arriving on my own and I'm wishing that she was with me so that we could arrive together, and so that I could have some time alone with her to tell her the news before I meet her parents. I'm travelling through rush hour and the train is overcrowded; I'm squashed between passengers in a stuffy corridor and I'm feeling incredibly uncomfortable and on edge. I don't know what to expect with her parents because we haven't really talked about them. I ring her to tell her that I'm on my way and she's saying how important this is to her; she's really grateful that I'm coming all this way. I tell her that I'm running a little early and that I can't wait to see her and we agree to the following ground rule:

Train Platform: Neutral-Low-Mixed. Rule Adherence Benefit.

My train is not far from the station; I'm meeting my friend and I'm wondering when I'll tell him the news; a letter arrived for him this morning and I opened it to get the results of the tests. He'll have to take his car into the garage when he gets home to have new spark plugs fitted, because the garage didn't have any in this week. He went home a few days ago to spend some time with his parents and I've been finishing some work. I've got a free evening and his parents have invited me over for diner because he spends so much time talking about me.

I don't mind travelling over on my own, but I don't know where the restaurant is and I wouldn't mind having some time with him before I meet his parents. I'm travelling through rush hour but the train isn't too busy; the air's a bit stuffy in here but I've got a seat. I'm feeling a bit restless and I'm trying to amuse myself by guessing what the other passengers do for a living. I don't really know what to expect with his

parents because we haven't talked about them much, so tonight should be interesting. I ring him to tell him that I'm on my way and he's saying he's pleased that I'm coming over; he's hoping that we'll have a good evening. I tell him that I'm running a little early and that I'm not sure where to go when I get off the train, so he and I agree to the following ground rule:

Conditional and Card Array for Train Platform Scenario

If I agree to have dinner with her parents this evening (p),
then she must meet me on the platform (q)

p	I agree to have dinner with her parents this evening
¬*p*	I say that I want us to dine alone this evening
q	She meets me on the platform
¬*q*	She meets me in the bar with her parents

Appendix 3. Pre-Selection Task Rating. Participant Consent Form (Chapter 5).

Participant Consent Form

Study title: Emotional Nature and Intensity Rating Exercise

Thank you very much for agreeing to take part in this research project. The purpose of this form is to make sure that you are happy to take part in this research, and to confirm that you know what your participation involves. Please circle or delete, as appropriate, your responses to the following questions before signing this form.

Have you had the opportunity to ask questions and discuss the study?	YES / NO
If you have asked questions have you had satisfactory answers to your questions?	YES / NO
Do you understand that you are free to end your involvement with this project at any time?	YES / NO
Do you understand that you are free to choose not to answer a question without having to give a reason why?	YES / NO
Do you agree to take part in this study?	YES / NO
Do you grant permission for extracts from your responses to be used in reports of the research on the understanding that your anonymity will be maintained?	YES / NO

By signing this sheet I confirm that I have read, understood, and agreed to the conditions of consent for this study.

SIGNED.....

NAME IN BLOCK LETTERS.....

DEPARTMENT .....

AGE .....

DATE .....

Appendix 4. Rating Exercise Instructions: Conditional, Context and Card Array: Booklet Excerpt (Chapter 5)

Scenario Rating Exercise

Instructions

On the following pages you will find 9 individually presented scenarios. Each scenario includes an episode description that concludes with an agreement between the two people in the scenario. Each agreement takes the form of a ground rule. Following the agreement are four pieces of information that represent possible outcomes or events that might follow.

Your Task

Please read through each scenario at your normal reading speed and then rate each scenario on the dimension detailed below. Read through the first scenario and provide your ratings for this scenario before reading through and rating the second scenario. After you have read through and rated the second scenario, move on to the third and so on.

Do NOT spend too long thinking about your answers when rating these materials; it is your first answers or those that come easily to mind that I am wanting within this exercise.

There are NO right or wrong answers to these questions; it is vital that you give YOUR feelings in your answers to the items within this booklet. I am seeking to understand what feelings are evoked by these materials when YOU read through them. This is not a test.

Please be as honest and accurate as possible in your responses, and try to respond to each of the questions enclosed. This task should take about 40 minutes to complete. The answers provided by you within this session will not be used or stored in any way that would link your identity to them.

Please read the following rating exercise instructions and ensure that you understand what is required of you before beginning this exercise. You can refer to these instruction pages throughout this exercise.

Thank you for your time and assistance.

Rating Exercise

1. Read through the scenario one section at a time (episode, then ground rule and then all four potential episode outcomes), and then indicate how you felt when reading through each section by describing the two KEY or most intense feeling(s) you experienced. Read and rate each section before reading through and rating the following section. Use single words or phrases to describe the feelings evoked. Place each key feeling in one of the spaces provided, and indicate on the scale placed below your feeling the Intensity of the feeling evoked (0 = *Not at all*, 50 = *moderately*, 100 = *Very Strongly*).

2. After you have rated each section of a scenario, please indicate how you felt when reading through the scenario as a whole. Again, use single words or phrases to describe the feelings evoked. Place each key feeling in one of the spaces provided, and indicate on the scale placed below your feeling, the strength of the feeling evoked.

On the following page you will find an example scenario and an example of the rating format being used in this exercise.

(*cut to next page*)

Example Episode Description

I'm being driven along a dual carriageway by my boyfriend and I'm feeling tired. I can see the cloudy sky through the windscreen; he's got the windows open to get some fresh air
into the car and I'm feeling a bit cold. There isn't much traffic on the road and he's driving steadily; he looks a bit bored. We've been in the pub this evening to have a change of scene; I thought it would be good to go somewhere different so I

suggested this trip. He
looks happy enough as we're driving along although I want to talk about my day and he's not listening to me. I want this drive to come to an end and I'm hoping that we'll get home soon.

We come into a bend and the car goes into a slight skid; he's a good driver and there's plenty of room to pull out of it as he rounds the bend. He pushes me away when I pretend to try and take control of the wheel and I sit here with my hands under my legs humming to the tune on the CD. He pulls the car over onto the side of the road and stops for a rest. I ask him what he wants to do now, and he asks if I'll come home with him to round off the evening. He looks quite tired and has had a few drinks, I'm quite sober and I tell him that I fancy having a drive so he and I agree to the following ground rule:

Ground Rule

If I agree to come back with him, then he must let me drive us home

Potential Outcomes

I agree to come home with him
I tell him that I need to be elsewhere
He lets me drive us to his home
He drives us back to his home

'Whilst reading through this episode I felt: …. (insert feeling here) .....'

(Intensity = 74)

The scale provided ranges from '0 *no feeling at all*' to '50 *moderately*' to '100 *very strongly*'; these descriptions refer to your given feeling in terms of the intensity with which this was felt. Please select the number (between 0 and 100) that best represents how intensely you felt each emotion described. Please read through each episode description carefully as these differ across scenarios.

If you cannot provide two/three feelings for each section, then provide as many as you can in the spaces below. The spaces are provided for you to indicate your key responses to these scenarios. If no feelings are evoked whilst reading through any of these sections, then please indicate this in the space provided.

Once again, do not think too deeply about your response; I want you to indicate what feelings were evoked when reading the specified sections.

Scenario 1

I'm flying down the slope at great speed on a sledge and my girlfriend overtakes me; she's cheering loudly and laughing at me for being so slow; we're in Italy for a couple of weeks to have a break from uni and the weather is absolutely glorious. I can feel the wind blowing through my hair as I head down the slope behind her. My face feels warm in the sun and I shut my eyes for a few seconds to enjoy this feeling; at this moment I think I could stay
here forever. We've been here for four days and every one of them has been amazing. As I'm coming past a clump of trees on my right, I'm pelted with snowballs; I can see my girlfriend now on the edge of the trees with a huge grin on her face.

I break sharply and set off after her through the trees; I catch her easily and she falls to the ground with me. After a bit of a tussle, she relinquishes and promises not to throw any more snowballs for the next hour. I love being with her; she's such good fun and she looks absolutely irresistible. It's getting late and we're feeling in need of dinner so we walk back through the trees together. I tell her that I think I need some serious looking after in order to make up for all her teasing; I don't tell her that I've found a fabulous restaurant over to left on this hillside or that I've booked us a table for diner as a surprise present, so for the journey downhill she and I agree to the following ground rule:

Ground Rule

If I fall off my sledge, then she must come back and find me

Potential Outcomes

I fall off my sledge
I get off the hill without
falling She comes back and
finds me She runs on ahead
without me

Scenario 1. Episode

Whilst reading through this episode I felt: Intensity =

Whilst reading through this episode I felt: Intensity =

Ground Rule

Whilst reading through this ground rule I felt: Intensity =

Whilst reading through this ground rule I felt: Intensity =

Episode Outcome One

Whilst reading through this episode outcome I felt: Intensity =

Whilst reading through this episode outcome I felt: Intensity

= Episode Outcome Two

Whilst reading through this episode outcome I felt: Intensity =

Whilst reading through this episode outcome I felt: Intensity =

Episode Outcome Three

Whilst reading through this episode outcome I felt: Intensity =

Whilst reading through this episode outcome I felt: Intensity =

Episode Outcome Four

Whilst reading through this episode outcome I felt: Intensity =

Whilst reading through this episode outcome I felt: Intensity =

1.2. Describe the three KEY or most intense feeling(s) you experienced whilst reading through the scenario as a whole, using single words or phrases to describe the feelings evoked.

Whilst reading through this episode I felt: Intensity =

Whilst reading through this episode I felt: Intensity =

Whilst reading through this episode I felt: Intensity =

Appendix 5. Autobiographical Recall Task Instructions (Chapter 6)

Joyful Condition

In this exercise you will be given ten minutes to write about a recent experience that made you feel particularly happy or joyful. Your experience might, for example, have involved an event that was particularly rewarding or pleasurable; it might have involved actions of yourself and/ or others which made you feel incredibly pleased or delighted. Try to recall how you felt at the time of this experience and to relive these moments as vividly as possible whilst you are writing about/ describing these.

Focus your description on the feelings, thoughts, images, physical sensations and reactions felt during this experience, and which you might have experienced on other occasions when you've felt particularly happy or joyful.

Please remember that the answers provided by you within this session will not be used or stored in any way that would link your identity to them.

Anxiogenic Condition

In this exercise you will be given ten minutes to write about a recent experience that made you feel particularly frightened or anxious. Your experience might, for example, have involved an event that was particularly unsettling, stressful or worrying; it might have involved actions of yourself and/ or others which made you feel incredibly anxious or unnerved. Try to recall how you felt at the time of this experience and to relive these moments as vividly as possible whilst you are writing about/ describing these.

Focus your description on the feelings, thoughts, images, physical sensations and reactions felt during this experience, and which you might have experienced on other occasions when you've felt particularly frightened or anxious.

Please remember that the answers provided by you within this session will not be used or stored in any way that would link your identity to them.

Anger Condition

In this exercise you will be given ten minutes to write about a recent experience that made you feel particularly irritated or angry. Your experience might, for example, have involved an event that was particularly unfair or avoidable; it might have involved actions of yourself and/ or others which made you feel incredibly annoyed or exasperated. Try to recall how you felt at the time of this experience and to relive these moments as vividly as possible whilst you are writing about/ describing these in the space below.

Focus your description on the feelings, thoughts, images, physical sensations and reactions felt during this experience, and which you might have experienced on other occasions when you've felt particularly annoyed or angry.

Remember that the answers provided by you within this session will not be used or stored in any way that would link your identity to them.

Neutral Condition

In this exercise you will be given ten minutes to write about a recent experience about which you felt quite neutral, or towards which you had no particular response. Your experience might, for example, have involved an event that was particularly everyday or unnoteworthy; it might have involved actions of yourself and/ or others about which you had little opinion or feelings. Try to recall how you felt at the time of this experience and to relive these moments whilst you are writing about/ describing these.

Focus your description on the situation context and on the thoughts/ feelings that occurred during this experience.

Please remember that the answers provided by you within this session will not be used or stored in any way that would link your identity to them.

Control Condition

Omission of emotion induction (i.e., emotion induction exercise and second measure of emotion); participants in the control emotion-as-peripheral condition were not

exposed to an emotion induction. They provided one measure of current feeling state prior to selection task completion.

Appendix 6. Autobiographical Recall Emotion Induction: Feeling-Label Measure Pre and Post Task (Chapter 6).

Instructions

Indicate how you feel right now, at this moment, by describing in the spaces provided below, the three key or most intense emotions that you're feeling. Use one or two words to describe each emotion, and select the appropriate position on the scale placed below each emotion to indicate the strength of this feeling.

You will find an example of the rating format being used in these exercises below.

'I feel …….. (Insert emotion here) ……..

Not at all Moderately Very Strongly

If you are feeling NO emotions at this moment, please indicate this in the space provided. If you cannot think of three feelings, give details of those feelings that come to mind and then move on to the next section. Do not spend too long thinking about your feelings; a quick response is required.

I feel …….

Not at all Moderately Very Strongly

I feel …….

Not at all Moderately Very Strongly

I feel …….

Not at all Moderately Very Strongly

Appendix 7. Autobiographical Recall Emotion Induction: DES Measure, Pre and Post Task (Chapter 6).

Instructions.

Below are a number of words that describe different feelings. Indicate to what extent you feel each of the following right now, at the present moment, by placing a cross in the position on the line scale placed alongside each emotion that best indicates the degree to which you feel each of the following.

Please use make of the full scale in this exercise.

Tense

Not at all Moderately Very Strongly

Sad

Not at all Moderately Very Strongly

Affectionate

Not at all Moderately Very Strongly

Scared

Not at all Moderately Very Strongly

Happy

Not at all Moderately Very Strongly

Irritated

Not at all Moderately Very Strongly

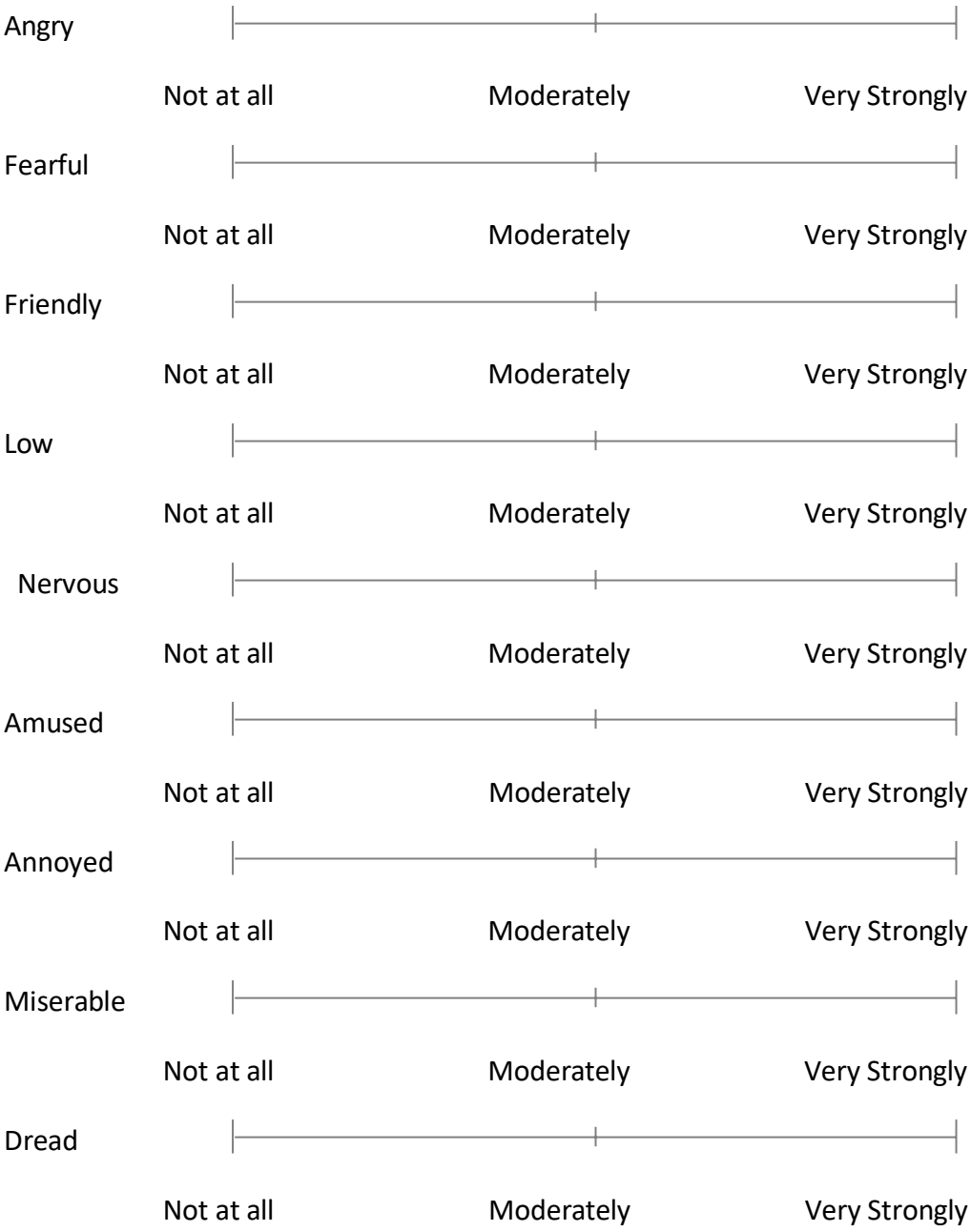
Anxious

Not at all Moderately Very Strongly

Joyful

Not at all Moderately Very Strongly

Continue overleaf


Angry
Not at all
Moderately
Very Strongly
Fearful
Not at all
Moderately
Very Strongly
Friendly
Not at all
Moderately
Very Strongly
Low
Not at all
Moderately
Very Strongly
Nervous
Not at all
Moderately
Very Strongly
Amused
Not at all
Moderately
Very Strongly
Annoyed
Not at all
Moderately
Very Strongly
Miserable
Not at all
Moderately
Very Strongly
Dread
Not at all
Moderately
Very Strongly

Appendix 8. First Selection Task: Selection Task Instructions (Chapter 6)

Introduction

On the following pages you will find descriptions of six individually presented situations (scenarios). Each scenario includes a description of an episode that concludes with an agreement between two friends, colleagues or partners. For this exercise, imagine that YOU are the person whose perspective is described within each of the situation scenarios, and that *you are experiencing* each of the situations *as they are described*. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours *or* YOU and your girlfriend, or YOU and a colleague, according to who is described within
the following situations. If you don't currently have a girlfriend, then please imagine that you do.

Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Within each scenario, your agreements are expressed as ground rules. Following the agreement you will see four pieces of information that represent possible episode outcomes or events that might follow the agreement; each of these pieces of information will be displayed on a separate record card.

On one side of *each* record card is information about *your* actions after agreement to the ground rule, and on the other side of each record card is information about the actions of your *friend, girlfriend* or *colleague* after agreement to the ground rule in the situation described. Within each of the situations described, you can see what is written on only one side of each of the four cards and so you have only partial access to information about the four episode outcomes.

Your Task

Your task is to decide, for each scenario, which of the cards would need to be turned over (*which bits of information you would need to check*) to find out whether or not your friend, girlfriend or colleague breaks the ground rule that you

agreed to within the situation described. Indicate which cards would definitely need to be turned over by selecting (place a cross in the space positioned below) each card that you need to turn.

Please make sure that you have read and understand these instructions before beginning this exercise: when you are ready to start, turn over the page and begin.

Appendix 9. Feeling Label Measure of Emotion: First Selection Task (Chapter 6)

Scenario Rating Exercise: Booklet II

Instructions

In the booklet that accompanies this one (Scenario rating exercise: Booklet I) you will find the six scenarios used in the previous exercise. Once again, imagine that YOU are the person whose experience is being described in each of the scenarios and that *you are experiencing the situation* as it is being described.

Your Task

Read through each scenario at your normal reading speed and then rate each scenario on the dimensions detailed below. Do *NOT* spend too long thinking about your answers when rating these materials; it is your first answers or those that come easily to mind that I am wanting within this exercise. There are *NO* right or wrong answers; it is vital that you give *YOUR* thoughts and feelings in your answers to these questions. I am seeking to understand what thoughts or feelings are evoked when YOU read through these materials, rather than how you think you should feel or how you think others would feel. Please be as honest and accurate as possible in your responses and try to respond to each of the questions enclosed.

Please read the following instructions and ensure that you understand what is required of you before beginning this exercise. If the instructions are not clear, please ask for clarification of your task. You can refer to these instruction pages throughout this exercise.

Rating Dimensions

Feelings: Read through each scenario *one section at a time* and describe in the spaces provided the two <u>key</u> or <u>most intense emotions</u> you felt when reading through each section. Use one or two words to describe the emotions evoked. Place each emotion in one of the spaces provided and then indicate <u>why</u> you felt this emotion on the line placed below (i.e., what was this feeling about, or what actions or events were associated with this). On the scale placed below this information, indicate how intensely you felt each emotion by placing a cross in the position that best represents

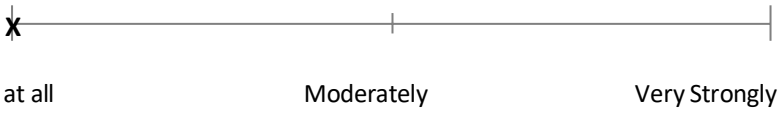
the strength of feeling evoked. If NO emotions are evoked whilst reading through one or more of these sections, or you don't know why you felt a particular emotion, then please indicate this in the space provided.

Read through and rate each scenario section (episode, then ground rule and then each of the four potential episode outcomes) *before* reading through and rating the following section within each scenario.

You will find an example of the rating format being used in this exercise below.

'Whilst reading through this episode I felt …….. (Insert emotion here) ……..

Because … (Say why you felt this emotion here: e.g., what actions or events were associated with this) ...



Once again, do NOT spend too long thinking about your feelings; a quick response is required.

After you have recorded the emotions experienced when reading through the scenario, rate the scenario on the following four dimensions (frequency, realism, risk, outcome importance) *before* moving on to the next scenario and repeating this process. Provide your responses to these items by selecting a number from the scale provided with each of the questions in these sections to represent your response.

Please do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these situations/ exercise individually.

When completing each of the above sections, please pay careful attention to the words/ phrases used to describe points along the scale for each response, as these do vary, and select the number that best represents your response to each item. WRITE this number in the space provided for responding to each of the questions and make use of the full scale (each of which ranges from 0 to 10) when selecting your response.

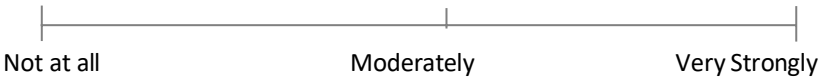
Thank you for your time and assistance.

Scenario 1

Episode 1

Whilst reading through this episode I felt ……..

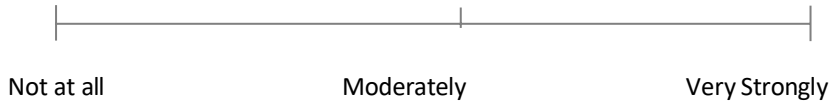
Because ……



Ground Rule 1

Whilst reading through this ground rule I felt ……

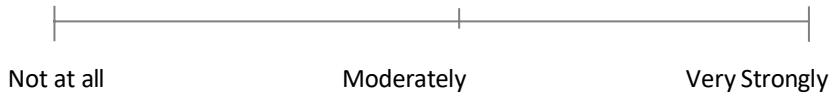
Because ……



Episode Outcome One

Whilst reading through this episode outcome I felt …….

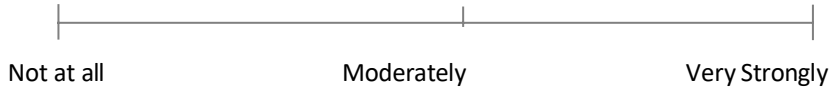
Because ……



Episode Outcome Two

Whilst reading through this episode I felt ……..

Because ……



Appendix 10. Realism, Familiarity, Risk, Importance Measures: First Selection Task (Chapter 6)

Scenario Rating Exercise: Booklet II

Instructions

In the booklet that accompanies this one (Scenario rating exercise: Booklet I) you will find the six scenarios used in the previous exercise. Once again, imagine that YOU are the person whose experience is being described in each of the scenarios and that *you are experiencing the situation* as it is being described.

Your Task

Read through each scenario at your normal reading speed and then rate each scenario on the dimensions detailed below. Do *NOT* spend too long thinking about your answers when rating these materials; it is your first answers or those that come easily to mind that I am wanting within this exercise. There are *NO* right or wrong answers; it is vital that you give *YOUR* thoughts and feelings in your answers to these questions. I am seeking to understand what thoughts or feelings are evoked when YOU read through these materials, rather than how you think you should feel or how you think others would feel. Please be as honest and accurate as possible in your responses and try to respond to each of the questions enclosed.

Please read the following instructions and ensure that you understand what is required of you before beginning this exercise. If the instructions are not clear, please ask for clarification of your task. You can refer to these instruction pages throughout this exercise.

Rating Dimensions

2. **a.** How realistic is the situation described within this scenario? (0 = not at all, 2 = a little, 5 = moderately, 8 = highly, 10 = very highly): …….

If you wish to qualify this general assessment of the situation, please describe your qualification(s) here.

…….

2. b. How easy would it be for you to imagine *yourself* in this situation, or in a situation that is very similar to the one described within this scenario? (0 = impossible, 2 = difficult, 5
= moderately easy, 8 = easy, 10 = very easy): ……

If you wish to qualify this general assessment of the situation, please describe your qualification(s) here.

…….

3. a. How frequently have *you* and /or close friends and/ or family experienced the situation or a situation that is very similar to the one described within this scenario? (0 = never, 2 = infrequently, 5 = moderately, 8 = often, 10 = very frequently): ……

3.b. How frequently do you think *others in general* experience the situation or a situation that is very similar to the one described within this scenario? (0 = never, 2 = infrequently, 5 = moderately, 8 = often, 10 = very frequently):
……

4. Describe the nature and severity of risk associated with or present within this scenario for YOU. Describe the nature of each risk using single words or short phrases, and indicate the severity of the identified risk by placing a number (any number from 1 – 10) to represent this in the space provided. If you feel that there are NO risks associated with a scenario, then please indicate this in the space provided. There are spaces to provide four responses here, but if you cannot think of four move on to the next section. Severity relates to the possible cost of this happening, ignoring the probability of whether or not the risk is likely to happen.

The following broad categories provide examples of the types of risk that you might encounter on a day-to-day basis; financial; self-esteem; embarrassment; relationship loss; reputation; academic; physical health; moral; legal; future prospects/ welfare. This list is not exhaustive; it is intended as a guide for understanding the type of things that might be might be thought of as risks.

Risk **a.** ……

Severity (0 = insignificant, 2 = mild, 5 = moderate, 8 = severe, 10 = very severe): ……

If you wish to qualify this general assessment of the situation, please describe your qualification(s) here.……

Risk **b.** ……

Severity (0 = insignificant, 2 = mild, 5 = moderate, 8 = severe, 10 = very severe): ……

If you wish to qualify this general assessment of the situation, please describe your qualification(s) here.……

Risk **c.** ……

Severity (0 = insignificant, 2 = mild, 5 = moderate, 8 = severe, 10 = very severe): ……

If you wish to qualify this general assessment of the situation, please describe your qualification(s) here.……

Risk **d.** ……

Severity (0 = insignificant, 2 = mild, 5 = moderate, 8 = severe, 10 = very severe): ……

If you wish to qualify this general assessment of the situation, please describe your qualification(s) here.……

5. Imagine that *you are in* the situation described within this scenario and answer the following:

a. How important would it be for you to gain a favourable outcome within this scenario? (0= not at all, 2 = a little, 5 = moderately, 8 = very important, 10 = essential):

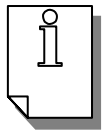
……..

b. How important would it be for you to avoid a negative outcome within this scenario? (0 = not at all, 2 = a little, 5 = moderately, 8 = very important, 10 = essential):

……..

c. How important would the outcome of this episode be for you (*i.e., does it matter what the outcome is*)? (0 = not at all, 2 = a little, 5 = moderately, 8 = very important, 10 = essential): ……

Appendix 11. The First Selection Task: Participant Information Sheet (Chapter 6).



Project Title: Thinking in Context

In this study you will be asked to complete either four or six short exercises; in total these should take between one to one-and-a-half hours to complete. The research purpose of each of these is to gain a better understanding of how people think in the types of situations that will be presented to you. Within this study you will be asked to provide brief details of feelings about everyday situation contexts, to make choices between presented situation outcomes, provide brief feedback on your feelings and to rate presented social situations on various dimensions (including familiarity, realism and importance). You may also be asked to recall memories of a recent experience that made you feel anxious, angry or happy, and to provide a written description of these memories. You must have a good understanding of written and spoken English in order to take part in this study.

This project is being conducted as part of my PhD research at the University of Leeds; it thus complies with the requirements of the IPS (Institute of Psychological Sciences) Ethics Committee and has been registered using the electronic self-certification scheme (Ref. No. 08322-01); it also adheres to the British Psychological Society's ethical requirements for research with humans. All information given by you during this research session will remain confidential; I cannot discuss details revealed here by you in a way that would reveal your identity with any other persons. Your name will not be associated with information provided by you within this study, and other potentially identifying details will be changed in order to protect your identity and the identity of others. Anonymized extracts from your data may be included within my PhD work, which will be read by my supervisor and up to two additional academic assessors. My supervisor will also have access to anonymized copies of your data. It is possible that your data may be used in future conference presentations or journal article publications; in either event, this will not be used in a way that might reveal your identity.

You should not feel pressured to answer particular questions during this exercise; you are free to not answer questions that you do not wish to answer and need give

no explanation as to why you would prefer not to answer these. If you wish to withdraw from the study at any time after agreeing to participate, for any reason, please feel free to do so. You have the right to choose to withdraw your consent to participation at any time either during or immediately following this session, and in such an event any data collected from you would be destroyed.

If you decide to participate and have any questions or concerns at all about this project, please contact me in order to discuss these. If you feel unable to discuss matters with me for any reason, please contact my supervisor in order to discuss your concerns. Thank you for your time and assistance

Appendix 12. First Selection Task. Participant Consent Form (Chapter 6).

Study title: Thinking in Context

Thank you very much for agreeing to take part in this research project. The purpose of this form is to make sure that you are happy to take part in this research, and to confirm that you know what your participation involves. Please circle or delete, as appropriate, your responses to the following questions before signing this form.

Have you had the opportunity to ask questions and discuss the study?	YES / NO
If you have asked questions have you had satisfactory answers to your questions?	YES / NO
Do you understand that you are free to end your involvement with this project at any time?	YES / NO
Do you understand that you are free to choose not to answer a question without having to give a reason why?	YES / NO
Do you agree to take part in this study?	YES / NO
Do you grant permission for extracts from your responses to be used in reports of the research on the understanding that your anonymity will be maintained?	YES / NO

By signing this sheet I confirm that I have read, understood, and agreed to the conditions of consent for this study.

SIGNED.....

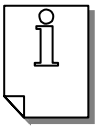
NAME IN BLOCK LETTERS.....

DEPARTMENT.....

AGE.....

DATE.....

Appendix 13. Selection Task Two. Project Information Sheet (Chapter 7)



Project Title: Thinking in Context 2.

In this study you will be asked to complete one short exercise; in total this should take no more than twenty minutes to complete. The research purpose of this exercise is to gain a better understanding of how people think in the types of situations that will be presented to you and to explore potential differences in task responses with different task instruction versions. Within this study you will be asked to read three descriptions of everyday social situations, to imagine that these descriptions are describing your experiences and to make choices between presented situation outcomes.

This project is being conducted as part of my PhD research at the University of Leeds; it thus complies with the requirements of the IPS (Institute of Psychological Sciences) Ethics Committee and has been registered using the electronic self-certification scheme (Ref. No. 08272-02); it also adheres to the British Psychological Society's ethical requirements for research with humans. All information given by you during this research session will remain confidential; I cannot discuss details revealed here by you in a way that would reveal your identity with any other persons. Your name and personal details (age, gender and department or School) will be kept securely and separately from the rest of your data. Your name will not be associated with information provided by you within this study.

Anonymized extracts from your data may be included within my PhD work, which will be read by my supervisor and up to two additional academic assessors. It is possible that your data may be used in future conference presentations or journal article publications; in either event, this will not be used in a way that might reveal your identity.

You should not feel pressured to answer particular questions during this exercise; you are free to not answer questions that you do not wish to answer and need give no explanation as to why you would prefer not to answer these. If you wish to withdraw from the study at any time after agreeing to participate, for any reason, please feel free to do so. You have the right to choose to withdraw your consent to participation at any time either during or immediately following this session, and in such an event

any data collected from you would be destroyed.

If you decide to participate and have any questions or concerns at all about this project, please contact me in order to discuss these. If you feel unable to discuss matters with me for any reason, then you may contact my project supervisor (see below for details) in order to discuss your concerns.

Thank you for your time and assistance

Appendix 14. Selection Task Two. Participant Consent Form (Chapter 7).

Study Title: Thinking in Context 2.

The purpose of this form is to make sure that you are happy to take part in this research project, and to confirm that you know what your participation involves. Please take a few minutes to read the following information carefully before you agree to participate. If at any time you have any questions about this study, please feel free to ask these now or contact me with these via email.

In this study you will be asked to complete one short exercise; in total this should take no more than twenty minutes to complete. The research purpose of this exercise is to gain a better understanding of how people think in the types of situations that will be presented to you and to explore potential differences in task responses with different task instruction versions. Within this study you will be asked to read three descriptions of everyday social situations, to imagine that these descriptions are describing your experiences and to make choices between presented situation outcomes.

This project is being conducted as part of my PhD research at the University of Leeds; it thus complies with the requirements of the Institute of Psychological Sciences (IPS) Ethics Committee and has been registered using the electronic self-certification scheme (Ref. No. 08272-02); it also adheres to the British Psychological Society's ethical requirements for research with humans. All information given by you during this research session will remain confidential; I cannot discuss details revealed here by you in a way that would reveal your identity with any other persons. Your name and personal details (age, gender and department or School) will be kept securely and separately from the rest of your data. Your name will not be associated with information provided by you within this study. It is possible that your data may be used in future conference presentations or journal article publications; in either event, this will not be used in a way that might reveal your identity.

You should not feel pressured to answer particular questions during this exercise; you are free to not answer questions that you do not wish to answer and need give no explanation as to why you would prefer not to answer these. If you wish to withdraw

from the study at any time after agreeing to participate, for any reason, please feel free to do so. You have the right to choose to withdraw your consent to participation at any time either during or immediately following this session, and in such an event any data collected from you would be destroyed.

If you would like to participate in this study, please sign this consent form overleaf to signify that (1) you have voluntarily consented to participate in this study, and (2) you understand what your participation involves.

By signing this form you are agreeing to the following statements:

1. I confirm that I have read and understood the information for this study provided overleaf
2. I understand that my participation is voluntary and that I may withdraw from this study at any time without explanation.
3. As a participant, I understand that I am free to choose not to answer particular questions without having to give a reason why.
4. I agree to take part in this study

Appendix 15. Selection Task Two. Selection Task Instructions (Chapter 7)

Record Cards: Self (No Third Party)

Instructions

On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, colleagues or partners. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner, or YOU and a colleague, according to who is described within the following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.

Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four record cards, which contain a record of events that followed the agreements on four different occasions (each card represents a different occasion).

On one side of each card is information about your actions after agreement to the ground rule on a specific occasion, and on the other side of each card is information about the associated actions of your friend, partner, or colleague after agreement to the ground rule on the same occasion. Within each of the situations described, you can see what is written on only one side of each of the four cards and so you have only partial access to information about each of the four different situation outcomes.

Your Task

Your task is to decide, for each scenario, which of the cards would need to be turned over (which bits of information you would need to read or check) to find out whether

or not your friend, partner or colleague breaks the ground rule that you agreed to within the situation described. Indicate which card or cards would definitely need to be turned over by placing a cross in the space positioned below each card that you need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.

Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Diary Pages: Self (No Third Party)

Instructions

On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, colleagues. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner, or YOU and a colleague, according to who is described within the following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.

Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Imagine that you've kept a diary for the past few weeks and that you've got records of what happened when you've been out after each of the agreements.

Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four diary pages, which contain a record of events that followed the agreements on four different occasions (each card represents a different

occasion).

On one side of each page is information about your actions after agreement to the ground rule on a specific occasion, and on the other side of each page is information about the associated actions of your friend, or partner, or colleague after agreement to the ground rule on the same occasion. Within each of the situations described, you can see what is written on only one side of each of the four pages and so you have only partial access to information about each of the four different situation outcomes.

Your Task

Your task is to decide, for each scenario, which of the pages would need to be turned over (which bits of information you would need to read or check) to find out whether or not your friend, partner or colleague breaks the ground rule that you agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.

Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Diary Pages: Other (Third Party) Instructions

On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, colleagues or partners. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner, or YOU and a colleague, according to who is described within the following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.

Below is an example of the kind of agreement that you will see in each of the following scenarios.

‘If I agree to pick you up in the morning, then you must be ready to leave at 10 am.’

Imagine that one of your friends has kept a diary for the past few weeks and that they’ve got records of what happened when you’ve been out after each of the agreements.

Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four diary pages, which contain a record of events that followed the agreements on four different occasions (each card represents a different occasion).

On one side of each page is information about your actions after agreement to the ground rule on a specific occasion, and on the other side of each page is information about the associated actions of your friend, or partner or colleague after agreement to the ground rule on the same occasion. Within each of the situations described, you can see what is written on only one side of each of the four pages and so you have only partial access to information about each of the four different situation outcomes.

Your Task

Your task is to decide, for each scenario, which of the pages would need to be turned over (which bits of information you would need to read or check) to find out whether or not your friend, partner or colleague breaks the ground rule that you agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.

Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Appendix 16. Rule Violation Expectation. Rating Task Instructions (Chapter 8)

Instructions

The purpose of this exercise is to validate the nature of a set of task instructions for use in future studies. Please Do Not spend too long thinking about your answers in this exercise; there are *NO* right or wrong answers. Please be as honest and accurate as possible in your responses; it is vital that you give *YOUR* thoughts and feelings in your responses to this task.

On the following two pages you will find six similar instructions for a decision task. All of these instructions are set in the same context, which you will see directly below this paragraph, and which describes a task about three social situations in which agreements are made between partners or between two friends.

Decision Task Instruction Context

On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, or colleagues or partners. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner, or YOU and a colleague, according to who is described within the following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.

Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four record cards, which contain a record of events that followed the agreements on four different occasions (each card represents a different occasion).

On one side of each card is information about your actions after agreement to the

ground rule on a specific occasion (i.e., what you did), and on the other side of each card is information about the associated actions of your friend or partner or colleague (i.e., what they did in response). Within each of the situations described, you can see what is written on only one side of each of the four cards and so you have only partial access to information about each of the four different situation outcomes.

Your Task is to say, for each of the six instructions…

A. Whether the instruction is asking you to check to see whether the friend/ partner kept or broke the agreement referred to in the instructions: circle 'kept' if you think the instructions are asking you to check to see of they kept the agreement; circle 'broke' if you think they're asking you to check to see if they broke the agreement.

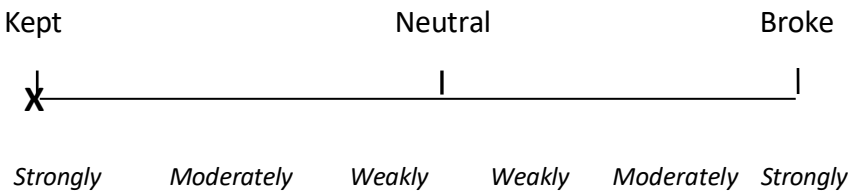
B. Whether or not the instruction leads you to expect that the friend/ partner referred to will break their agreement: circle 'NO' if they do not lead you to expect that they will break their agreement (if they lead to no expectation or to an expectation other than that the person referred to will break their agreement, then select this response); circle 'YES' if they lead to expect that they will break their agreement.

And

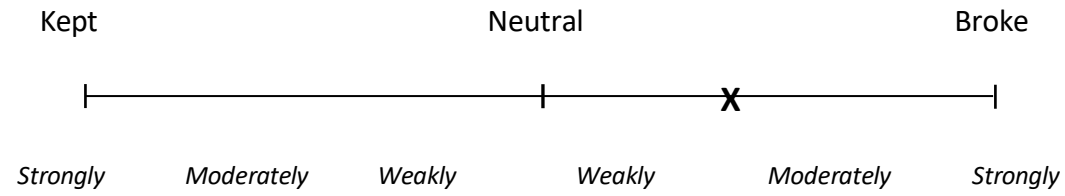
C. Rate the following six instructions according to how weakly or strongly you think they focus the task described on checking to see if the friend/ partner kept or broke the agreement referred to in the instructions; place a cross on the scale placed below each instruction in the position that best describes your response.

For example…

I you think that the instructions focus the task very strongly on checking to see if the friend/ partner referred to kept their agreement, then place a cross in the position indicated below



I you think that the instructions focus the task moderately on checking to see if the friend/ partner referred to broke their agreement, then place a cross in the position indicated below



If possible, you should assign a different scale intensity position to each of the following six instructions, by making full use of the scale provided in order to achieve this.

However, if you think that two or more instructions are equal in terms of how strongly or weakly they focus the task on checking to see if the friend/ partner kept or broke the agreement referred to in the instructions, then you may assign equal scale intensity positions to these instructions.

Please make sure that you understand the instructions before beginning this exercise.

Task Instructions

Your task is to decide, for each scenario, which of the pages would need to be turned over (*which bits of information you would need to read or check*) to find out whether or not your friend/ partner broke the ground rule that you agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you need to turn.

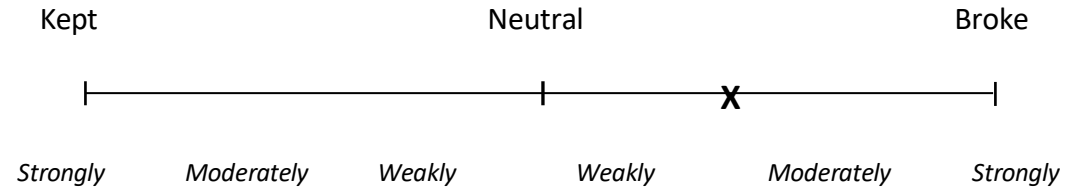
A. The instructions ask me to check to see if they… kept broke …the agreement

B. Do the instructions make you think that the friend/ partner will break their agreement?

NO / YES

C. How weakly or strongly does the instruction focus the task described on checking to

see if the friend/ partner referred to kept or broke the agreement referred to in the instructions?



Appendix 17. Rule Violation Expectation. Selection Task Instructions (Chapter 8)

Self-Diary Rationale:

Without Answer Veracity Instruction: Weak Rule-Breaking Foregrounding

Instructions

On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, partners or colleagues. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner or colleague according to who is described within the following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.

Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Imagine that you've kept a diary for the past few months and that you've got records of what happened when you've been out after each of the agreements.

Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four of your diary pages, which contain a record of events that followed the agreements on four different occasions (each page represents a different occasion).

On one side of each page is information about your actions after agreement to the ground rule on a specific occasion (i.e., what you did), and on the other side of each page is information about the associated actions of your friend, partner or colleague (i.e., what they did in response). Within each of the situations described, you can see what is written on only one side of each of the four pages and so you have only partial access to information about each of the four different situation outcomes.

Your Task

Your task is to decide, for each scenario, which page(s) would need to be turned over (*which bits of information you would need to read or check*) to find out whether your friend, partner or colleague broke the ground rule that you agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you would need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.
Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Self-Diary Rationale:
Without Answer Veracity Instruction: Moderate Rule-Breaking Foregrounding

Instructions
On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, partners or colleagues. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner or colleague according to who is described within the following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.
Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Imagine that you've kept a diary for the past few months and that you've got records of what happened when you've been out after each of the agreements.
Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four of your diary pages, which contain a record of events that

followed the agreements on four different occasions (each page represents a different occasion).

On one side of each page is information about your actions after agreement to the ground rule on a specific occasion (i.e., what you did), and on the other side of each page is information about the associated actions of your friend, partner or colleague (i.e., what they did in response). Within each of the situations described, you can see what is written on only one side of each of the four pages and so you have only partial access to information about each of the four different situation outcomes.

Your Task

You're not sure if your friend, partner or colleague will keep to your agreement in each of the following situations. Your task is to decide, for each scenario, which page(s) would need to be turned over (*which pages you would need to read or check*) to find out whether your friend, partner or colleague broke the ground rule that you agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you would need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.

Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Self-Diary Rationale:

Without Answer Veracity Instruction: Moderate-Strong Rule-Breaking Foregrounding

Instructions

On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, partners or colleagues. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner or colleague according to who is described within the

following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.
Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Imagine that you've kept a diary for the past few months and that you've got records of what happened when you've been out after each of the agreements.
Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four of your diary pages, which contain a record of events that followed the agreements on four different occasions (each page represents a different occasion).
On one side of each page is information about your actions after agreement to the ground rule on a specific occasion (i.e., what you did), and on the other side of each page is information about the associated actions of your friend, partner or colleague (i.e., what they did in response). Within each of the situations described, you can see what is written on only one side of each of the four pages and so you have only partial access to information about each of the four different situation outcomes.
Your Task
You're not confident that your friend, partner or colleague will keep to your agreement (keep their side of the bargain) in each of the following situations. Your task is to decide, for each scenario, which page(s) would need to be turned over (which pages *you would need to read or check*) to find out whether your friend, partner or colleague broke the ground rule that you agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you would need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.
Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Self-Diary Rationale:

Without Answer Veracity Instruction: Strong Rule-Breaking Foregrounding

Instructions

On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, partners or colleagues. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner or colleague according to who is described within the following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.

Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Imagine that you've kept a diary for the past few months and that you've got records of what happened when you've been out after each of the agreements.

Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four of your diary pages, which contain a record of events that followed the agreements on four different occasions (each page represents a different occasion).

On one side of each page is information about your actions after agreement to the ground rule on a specific occasion (i.e., what you did), and on the other side of each page is information about the associated actions of your friend, partner or colleague (i.e., what they did in response). Within each of the situations described, you can see what is written on only one side of each of the four pages and so you have only partial access to information about each of the four different situation outcomes.

Your Task

You don't think that your friend, partner or colleague will keep to your agreement in each of the following situations; they've often left you down in the past. Your task is to decide,

for each scenario, which page(s) would need to be turned over (which pages *you would need to read or check*) to find out whether your friend, partner or colleague broke the ground rule that you agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you would need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.
Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Self-Diary Rationale:
Without Answer Veracity Instruction: Very-Strong Rule-Breaking Foregrounding

Instructions
On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, partners or colleagues. For this exercise, imagine that YOUR experience is being described within each of the situations, and that you are experiencing each of the situations as they are described. You are to imagine, therefore, that the agreement is made between YOU and either a friend of yours or YOU and your partner or colleague according to who is described within the following situations. If you don't currently have a partner, then please imagine that you do in the situations that involve such a relationship for this exercise.
Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Imagine that you've kept a diary for the past few months and that you've got records of what happened when you've been out after each of the agreements.
Within each scenario, your agreements are expressed as ground rules. Following each agreement you will see four of your diary pages, which contain a record of events that

followed the agreements on four different occasions (each page represents a different occasion).

On one side of each page is information about your actions after agreement to the ground rule on a specific occasion (i.e., what you did), and on the other side of each page is information about the associated actions of your friend, partner or colleague (i.e., what they did in response). Within each of the situations described, you can see what is written on only one side of each of the four pages and so you have only partial access to information about each of the four different situation outcomes.

Your Task

You have good reasons to distrust your friend, partner or colleague in each of the following situations and you feel sure that they will break your agreement; they've often let you down in the past when they've agreed to similar ground rules and then not done what they said they would. Your task is to decide, for each scenario, which page(s) would need to be turned over (which pages *you would need to read or check*) to find out whether your friend, partner or colleague broke the ground rule that they agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you would need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.

Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Other Perspective, Other-Diary Rationale:

Without Answer Veracity Instruction: Weak Rule-Breaking Foregrounding

Instructions

On the following pages you will find descriptions of three different situations (scenarios), each of which concludes with an agreement between two friends, partners or colleagues. Within each scenario, their agreements are expressed as ground rules. Below is an example of the kind of agreement that you will see in each of the following scenarios.

'If I agree to pick you up in the morning, then you must be ready to leave at 10 am.'

Each of the situations is described from the perspective of one friend, partner or colleague. The person whose experience is described within each of the situations has kept a diary for the past few months, and has records of what happened when they've been out with their friend, partner or colleague after each of the agreements. In the following situation descriptions, after each agreement, you will see four of their diary pages, which contain a record of events that followed the agreements on four different occasions (each page represents a different occasion).

On one side of each page is information about the diary keepers' actions after agreement to the ground rule on a specific occasion (i.e., what they did), and on the other side of each page is information about the associated actions of their friend, partner or colleague (i.e., what they did in response). Within each of the situations described, you can see what is written on only one side of each of the four pages and so you have only partial access to information about each of the four different situation outcomes.

Your Task

Your task is to decide, for each scenario, which page(s) would need to be turned over (*which bits of information you would need to read or check*) to find out whether the diary keeper's friend, partner or colleague broke the ground rule that they agreed to within the situation described. Indicate which page or pages would definitely need to be turned over by placing a cross in the space positioned below each page that you would need to turn.

Please Do NOT change your answers after you have moved on to the next scenario; it is vital that you respond to each of these individually.

Please make sure that you have read and understand these instructions before beginning this exercise, you may refer back to these instructions throughout this exercise if you wish. When you are ready, you can begin the exercise.

Appendix 18. Selection Task Participant Information Sheet (Chapter 9)

First Person Perspective Instruction Version

Project Title: Thinking in Context.

In this study you will be asked to complete one short exercise; in total this should take no more than ten to twenty minutes to complete. The research purpose of this exercise is to gain a better understanding of how people think in the types of situations that will be presented to you and to explore potential differences in task responses with different task instruction versions. Within this study you will be asked to read three descriptions of everyday social situations, to imagine that these descriptions are describing your experiences and to make choices between presented situation outcomes.

This project is being conducted as part of my PhD research at the University of Leeds; it thus complies with the requirements of the IPS (Institute of Psychological Sciences) Ethics Committee and has been registered using the electronic self-certification scheme (Ref. No. 09075-03); it also adheres to the British Psychological Society's ethical requirements for research with humans. All information given by you during this research session will remain confidential; I cannot discuss details revealed here by you in a way that would reveal your identity with any other persons. Your name and personal details (age, gender and department or School) will be kept securely and separately from the rest of your data. Your name will not be associated with information provided by you within this study.

Anonymized extracts from your data may be included within my PhD work, which will be read by my supervisor and up to two additional academic assessors. It is possible that your data may be used in future conference presentations or journal article publications; in either event, this will not be used in a way that might reveal your identity.

You should not feel pressured to answer particular questions during this exercise; you are free to not answer questions that you do not wish to answer and need give no explanation as to why you would prefer not to answer these. If you wish to withdraw

from the study at any time after agreeing to participate, for any reason, please feel free to do so. You have the right to choose to withdraw your consent to participation at any time either during or immediately following this session, and in such an event any data collected from you would be destroyed.

If you decide to participate and have any questions or concerns at all about this project, please contact me in order to discuss these. If you feel unable to discuss matters with me for any reason, then you may contact my project supervisor (see below for details) in order to discuss your concerns.

Thank you for your time and assistance

Third Person Perspective Instruction Version

Project Title: Thinking in Context.

In this study you will be asked to complete one short exercise; in total this should take no more than ten to twenty minutes to complete. The research purpose of this exercise is to gain a better understanding of how people think in the types of situations that will be presented to you and to explore potential differences in task responses with different task instruction versions. Within this study you will be asked to read three descriptions of everyday social situations and to make choices between presented situation outcomes.

This project is being conducted as part of my PhD research at the University of Leeds; it thus complies with the requirements of the IPS (Institute of Psychological Sciences) Ethics Committee and has been registered using the electronic self-certification scheme (Ref. No. 09075-03); it also adheres to the British Psychological Society's ethical requirements for research with humans. All information given by you during this research session will remain confidential; I cannot discuss details revealed here by you in a way that would reveal your identity with any other persons. Your name and personal details (age, gender and department or School) will be kept securely and separately from the rest of your data. Your name will not be associated with information provided by you within this study.

Anonymized extracts from your data may be included within my PhD work, which will

be read by my supervisor and up to two additional academic assessors. It is possible that your data may be used in future conference presentations or journal article publications; in either event, this will not be used in a way that might reveal your identity.

You should not feel pressured to answer particular questions during this exercise; you are free to not answer questions that you do not wish to answer and need give no explanation as to why you would prefer not to answer these. If you wish to withdraw from the study at any time after agreeing to participate, for any reason, please feel free to do so. You have the right to choose to withdraw your consent to participation at any time either during or immediately following this session, and in such an event any data collected from you would be destroyed.

If you decide to participate and have any questions or concerns at all about this project, please contact me in order to discuss these. If you feel unable to discuss matters with me for any reason, then you may contact my project supervisor (see below for details) in order to discuss your concerns.

Thank you for your time and assistance