The lure of choice: The impact of increased choice on decision making

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Abstract

Reported in this thesis are ten experiments involving a total of 2,426 participants, which investigated the *lure of choice*. The lure of choice is demonstrated when an item is more likely to be chosen when it is presented in a choice set with other items than when it is presented in isolation. The lure of choice violates principles of rational decision making and can lead to sub-optimal decisions. In the early exploratory studies, participants made sequential selections between two target goods and one inferior lure item in lottery games and in decisions embedded in realistic scenarios. The first decision was between either a solitary target or a further decision between the second target and the lure. Participants were lured by choice, and took the same target more frequently when it was paired with a lure than when it was alone. Later studies were designed to test the argument that the lure of choice is a demonstration of an existing, well-documented context effect. Explanations of the asymmetric dominance effect failed to account for the lure of choice. The final set of studies was developed to demonstrate the applicability of the lure of choice in a range of domains, including replicating other relevant empirical studies. Results indicate that the lure of choice is a moderate but robust effect. Discussion focuses on attempts to resolve inconsistencies in the literature that on the one hand demonstrate that people crave choice, but on the other suggest in some situations too much choice can be demotivating or even harmful to the recipient. Conclusions suggest that the lure of choice is due to the overgeneralization of a preference for choice heuristic that has been very reliable in the natural world, but is less so in a world created by marketers geared towards maximising consumption. Other real world implications of the lure of choice are discussed.

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List of Tables and Figures

Abbreviations

ADE   Asymmetric dominance effect

BDM   Behavioural decision making

BDT   Behavioural decision theory

DF   Degrees of Freedom

EBA   Elimination by aspects

EU   Expected utility

EUT   Expected Utility Theory

EV   Expected value

IIA   Independence from irrelevant alternatives

JDM   Judgment and decision making

LOC   Lure of choice

N   Number

p Probability

SEU   Subjective expected utility

SEV   Subjective expected value

VM   Value maximisation

Chapter 1. Introduction

"There's small choice in rotten apples." William Shakespeare (1564–1616), Hortensio, in The Taming of the Shrew, act 1, sc. 1, l. 134-5.

1.1. The inspiration for the research

The motivation for this research was twofold: an observation from the real world and a current academic, sociological and political debate that is gathering momentum. These two underlying themes are not mutually exclusive, with one occasionally driving the other, and at other times, vice versa. It is important to note that the theoretical knowledge base which relates to this subject has not been static during the time this thesis has been completed[1]. Where appropriate, developments in the field that occurred after particular aspects of this work were conducted, and which could have informed the early studies are discussed and indicated as *post hoc* in the literature review. In other cases where concurrent developments in the field have influenced and informed the course of this research programme, their discussion has been included in subsequent empirical chapters. This reflects the dynamic nature of the field and the inductive nature of this work.

The first motivation was our society's seemingly unquenchable thirst for consumer choice. Rosenthal (2005) describes how choice has been extended to every corner of our lives, and traces the development of this aspect of modern society through philosophical, social theoretical and historical mechanisms:

> "for the majority of us, having *choice-* and having to make *choices* – has become and will continue to be the most important factor that influences both our personal lives and our prevailing culture" (Rosenthal, 2005, pp vix.).

At this point it is important to clarify the subtle differences in the use of the term "choice". Choice can be used as a description of a state of the world (noun): "I

have a choice" means having an array of options from which to select, and it can also be used as a verb: "I have a choice" can refer to the ability to make a decision or exercise a self-determined action (even if the choice is simply between "to act" or "not to act"). Wherever possible in this thesis the specific use of the term has been clarified, but the two meanings are inevitably linked – the latter would not be possible without the former, and both are important influences on human behaviour.

A predilection for choice (in the sense of an increased array) is evident when one takes a look at any UK high street that hosts numerous chain stores selling similar items (e.g. sportswear, cheap fashion clothing, or mobile phones and accessories) alongside pervasive fast food restaurants selling an array of generally low-grade, cheap food. Alternatively, a visit to any supermarket that offers not only thousands of different types of products (known as "macro-choice," Rozin, Fischler, Shields & Masson, 2006), but also many aisles of different brands of the same products ("micro-choice") demonstrates that our role as consumers has changed beyond recognition since our grandparents' day. The trend for increasing the range of goods on offer is so strong that many supermarkets are now commonly referred to as *hyper*-markets.

On a daily basis, we are faced with increasingly copious decisions that force us to select from a range of possible options, especially for what Schwartz (2004) calls non-durable (i.e. quickly used, replaceable) goods. Some decisions have relatively minor implications: where to buy lunch (and whether to have a ham salad sandwich on wholemeal bread or a cheese mayonnaise sandwich on white bread), which movie cinema to visit (and which film to watch when we get there), whether to buy a pint of milk from the garage or to drive further to the farm shop to buy a pint of fresh, organic milk. Other decisions have far more important ramifications: where

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[1] This thesis was started on a part time basis in 1999.

to attend university (and what course to study), which area to choose to live in (and which property to invest in), whether and how to look for a partner (and the person one eventually chooses), or which career to pursue (and which job to apply for). With the massive increase in information accessibility (predominately in the form of the internet), the range of choice available to consumers has exploded in recent decades. It is therefore more important than ever to understand at a behavioural and psychological level how humans react in the face of choice, and what happens when that choice is expanded.

So whilst it is undoubtedly true that the choice offered to the consumer is burgeoning, what is of interest for this thesis is the question of how we deal with the additional choice, and whether there may be deleterious consequences of increased choice. A personal anecdote illustrates the point: as a child I had my hair washed in a weekly Sunday night ritual, often with washing-up liquid. This was not because my parents were ill-informed or particularly poor, but in those days washing up liquid seemed like a sensible, multi-purpose household product. Hair conditioner was not yet widely available, and specialist children's shampoo was unheard of. Now, around my bathroom are at least 6 different hair-washing products, not including hair styling products. If one visits a well know UK chemist retailer online you can choose from at least 288 shampoos, 213 conditioners and 37 shampoos with conditioners, ranging in price from £1.59 to £7.99 each (source: www.boots.co.uk, September 2006). Likewise, when I go to the high street shop itself, I often feel overwhelmed by the choice, and end up picking an item, not because I think it will be the best thing for my hair, but probably for some other reason, such as the fact that it has been advertised recently, because it is on special offer, or simply because it is the easiest to pick up in my haste to exit the shop. Yet, on a regular basis, I am still tempted to visit the shop, some distance from my home, with its bright fluorescent

lights, piped "musak" and rows and rows of brightly coloured, sweetly perfumed

bottles of toiletries. This is despite the fact that my local shop, about half a mile

from my home, sells perfectly reasonable shampoo (and washing up liquid). Even

though as Babin, Darden and Griffin (1994) point out, retail assortment can enhance

the hedonic value of shopping, can the increased choice mean that the goods that we

end up with are different from, sometimes worse than, what we might have chosen in

the face of more limited choice? This anecdote illustrates the dilemma faced by

millions of ordinary people every day in numerous contexts. What do we do in the

face of choice, and is it always the most appropriate course of action?

Whether the consumer "demands" greater choice, or is simply forced to deal

with it by zealous marketers is debatable, and a question that will be addressed in

Chapter 2. Decades of marketing and psychological research does appear to support

the commonly held assumption in our society, and the predominant view from

economics, that the more choices we have, the better (McFadden, 1981). There is

some evidence for this. In the field of marketing research, Oppewal and Koelemeijer

(2005) found that consumers of cut flowers valued an increased range of products,

regardless of the specific options and number of items within the choice set.

Likewise, Hoch, Bradlow and Wansink (1999) found a significant positive

correlation between perceived size of an assortment and satisfaction with the

assortment. Other researchers have shown that there is a positive relationship

between choice and intrinsic motivation, perceived control, task performance and life

satisfaction (Deci, 1975, 1981; Deci & Ryan, 1985; Glass & Singer, 1972a, 1972b;

Langer & Rodin, 1976; Rotter, 1966; Schulz & Hanusa, 1978; Taylor, 1989; Taylor

& Brown, 1988; Zukerman, Porac, Lathin, Smith & Deci, 1978). There also appear

to be positive outcomes associated with choice even when those choices are trivial or

incidental (Cordova & Lepper, 1996; Dember, Galinksy & Warm, 1992; Swann & Pittman, 1977).

However, there has been something of an academic and philosophical backlash to the assumption that more choice is better, and this provides the second main motivation for this thesis. From an economic perspective, adding options to a choice set (without removing anything) means one can be as well off, or better than one was. However, this does not take into account the possibility of search costs or other transaction costs. Furthermore, it does not allow for the possibility that the benefit from an option depends on foregone options. It has been accepted for a while, at least in the behavioural decision making (BDM) literature, that people can find choosing from an increasingly large choice set difficult, confusing and time-consuming (Broder, 2003; Chu & Spires, 2003; Dhar, Nowlis & Sherman, 2000; Johnson, 1985; Luce, 1998; Malhotra, 1982; Payne, 1976; Payne, Bettman & Johnson, 1988; Tversky & Shafir, 1992a).

However, another set of writers have argued that the implications of too much choice are rather more sinister. Schwartz (2000, 2001, 2004), referred to the "tyranny of freedom" being the excessive individualistic ideology-led pressure to seek out self-determination, freedom and autonomy – features that appear valued above all else in modern American society, and perhaps the same could be said, or will be said in the future, of any Western culture. He argued that extreme societal ideologies based on economics and rational-decision theory can lead citizens to be extremely dissatisfied with their lives, and indeed, may even cause people to become depressed and ill. From this perspective there is a need to both de-emphasise individual freedom, and to re-evaluate the cultural constraints that are necessary for people to live meaningful and satisfying lives. The paradox of choice is that although people want autonomy, they also want to simplify life. For example, while

many people want autonomy at work, many also prefer to give themselves costly deadlines which reduce their choice of when to complete work (Ariely & Wertenbroch, 2002).

This debate is relevant and timely. While this thesis does not address the ideological motivations of consumer societies, in order to understand the important issues of self determination, control and intrinsic motivation we need to understand the basic psychological processes that lie at the heart of decision making. It may be that the behavioural responses to choice are simple, subconscious reactions (based on an inherited adaptive response to the decision situation). If these responses are subconscious, it may help explain why at one level people seem to want choice, yet at another level struggle to cope with it.

1.2. Aims and objectives

As mentioned above, whether increased choice is what we (as humans and consumers) actually want, or indeed need, are questions that have been addressed elsewhere (Desmeules, 2002; Fasolo, McClelland & Todd, in press; Kahn, 1998; Lehmann, 1998). The main aim of this research project is to go back to basics to investigate the most fundamental behavioural effects of increased choice, which might in turn influence our wants and needs. Grounded on a review of relevant literature from behavioural decision theory, consumer decision making research and investigations of preference for choice in animals, this research adopts an empirical experimental approach to investigate whether or not there are robust, predictable consequences of increasing choice for people.

Early on in the course of this work, a new decision context effect was identified, namely *the lure of choice* (Bown, Read & Summers, 2003). The objectives of this thesis are to provide a detailed description of the lure of choice and

provide a systematic evaluation of the causes, consequences and implications of the effect. Specific research questions are outlined below, and detailed hypotheses for individual experiments are presented in the relevant empirical chapters that follow. Through a rigorous series of empirical studies, the lure of choice was explored in a range of decision contexts including paper and pencil tasks conducted in a laboratory setting, scenario-based behavioural decisions with the general public and other consumer decisions. Some decision tasks used hypothetical gambles and other laboratory-based exercises, others reflected "real-life" decisions in a variety of situations and scenarios. By addressing the same issue in a variety of contexts, wider implications for many kinds of decision making can be drawn.

This work aims to add to our understanding of commonly-observed human behaviour and contribute to the scientific development of behavioural decision theory, as well as highlighting implications for all fields relevant to decision making, especially the consumer decision making field.

1.3. Introducing the central issue: The lure of choice

Potentially, in a changing or uncertain environment, the most robust decisions will be those that keep our options open rather than those that 'burn our bridges.' This is the underlying rationale for the popular, but academically controversial, management practice of scenario-planning (Goodwin & Wright, 2001; Lindgren & Bandhold, 2003; Van de Heijden, Bradfield, Burt, Cairns & Wright, 2002). The potential superiority of this flexibility is also clear in many other aspects of life. For instance, if you want to buy a new refrigerator, but are not yet sure which particular model, all things being equal (including pricing, convenience, location and so on), it is better to go to an electrical warehouse with a wide range of stock rather than a small local retailer that carries only a limited range of appliances in order to

maximise your potential options at the point you will decide. Suppose, however, that you have already done your homework, and the specific model you most like is only supplied by the small retailer. Should you go to the warehouse? Common sense suggests that you should not. Likewise, suppose that your favourite model is available at both outlets (at the same price), but the small retailer offers better aftercare services and fulfils your preference to support independent local shops. In this case, it again seems that you should go to the local shop to make your purchase. Is it possible, however, that you might nonetheless be attracted to the multiplicity of choice offered at the warehouse, even though the final outcome (in terms of the factors mentioned above such as after sales care) may be inferior to the one you could have had by shopping locally? If this occurs, you have been lured by choice.

A personal example illustrates how multiplicity of choice may be responsible for leading people astray. Leeds is a large, northern English city and its university one of the largest in the country with over 32,000 undergraduate and postgraduate students (source: ., September 2006). Students are initially attracted to not only the extensive range of leisure and recreation facilities on offer in the city and university (shopping, nightlife, sports, Student Union activities, etc.) but also the range of academic opportunities available. For example, for entry in 2006 there are 37 different fulltime undergraduate degree programmes available which include "management" as a substantial part of the programme (as single honours or joint honours combinations), ranging from single honours *Management* to joint honours *Management and Russian Civilisation*. This figure does not include the many individual module selections to be made within each programme. However, as an undergraduate personal tutor I see a significant number of students who come for advice because they are unhappy with their choice of programme and/or university. It is not unusual for these students to report initially having been attracted to the city

with its numerous opportunities and the vastness of the University's offerings, but now wishing to transfer to a different, possibly smaller institution with a more modest range of programmes which better suits their own personal needs. Although for some students this is because the University simply does not meet their expectations, others report feeling as if they had been "blinded by," or lured by, choice.

The potential psychological causes of these interesting and common real-life observations are examined in this thesis. As mentioned above, the aim of the work is to address the question of whether the presence of choice can lead people into choosing in a way that they otherwise would not have. It explores whether the outcomes people end up with (having made decisions in the presence of great choice), are actually as good as those they would have achieved in the presence of less choice. More specifically, due to increased choice, can people be drawn into a particular course of action (before the point at which they are required to make a final decision) that prevents them from achieving the (objectively and/or subjectively) optimal outcome? That is, does the presence of *choice qua choice* fundamentally alter either the way decisions are made, and/or the outcome of those decisions?

There is no irrationality in selecting a path that offers more choice, as long as this does not lead to a *worse* outcome. However, an attraction to choice may not be entirely benign. The term *lure of choice* refers to situations in which having a choice changes the likelihood that we will end up with a given option (Bown et al., 2003). For example, imagine a decision between A, B and C. If the likelihood of choosing A when offered an initial decision between {A, B} and C is greater than when offered a choice between A and {B, C}, then the presence of choice has lured decision makers in the direction of A. So, in the earlier example, you might be more

likely to end up buying a Smeg refrigerator if it is sold at the larger electrical retailer (which stocks Smeg, Electrolux, Whirlpool, Indesit and so on) than if it was the only model stocked at your local electrical store. Likewise, you might be more likely to end up studying *BA Philosophy and Management* at the University of Leeds rather than at your local Higher Education college.

If there is a lure of choice, it might work in the following way. Imagine that the preference ordering between the three alternatives is A, B ≻ C (i.e., A and B are both preferred to C, although the relationship between A and B is unspecified). In a choice between A and {B, C} the fact that B is associated with choice makes {B, C} more attractive than B would be alone. Once {B, C} is chosen however, the only attractive option left is B, and so it is chosen. The term *illusory choice* refers to situations, like the {B, C} choice, where there is an apparent choice between options yet one of the options is almost always taken over the other, usually because it is dominant. This is the basic premise of the lure of choice and is examined in greater detail in Chapter 3.

1.4. Summary of research questions of the thesis

The thesis addresses the following fundamental research questions: when faced with a diverse range of options, does the presence of choice (specifically the way choice sets are grouped and presented) lead us to act in a way that we would not otherwise have done? Furthermore, are the strategies that we employ to decide on particular courses of action under conditions of choice always the most appropriate in that context? If the answers to these two key questions are affirmative the next step is to investigate and document the exact nature of the way we act differently under conditions of choice, and to examine the precise conditions that can lead us to

act differently. Ultimately, the aim of the thesis is to address the question of why we might behave differently under conditions of choice.

Evidence from research in the animal world, behavioural decision research and work on consumer decision making is brought together and integrated to inform a series of studies designed to answer the following questions:

i.   Does the presence of choice lead people to act in a way they would not otherwise have done?

ii.   Are people attracted to choices that allow them the opportunity to choose from a number of options?

iii. If people are attracted to choice, is the effect strong enough to lead them to make sub-optimal decisions?

iv.   If people are attracted to choice, are there particular kinds of choice that are more attractive than others?

v.   If people are attracted to choice, is there a point at which too much choice is unattractive, and people are detracted from it?

vi.   If people are attracted to choice, what are the possible underlying causes of this attraction?

vii. If people are attracted to choice, what are the implications of this?

1.5. Overview of the thesis

The thesis is organised in the following way. Chapter 2 presents a review of the literature. The next three chapters present new empirical work. Chapter 3 introduces some exploratory lottery studies. Four studies were conducted to investigate whether the lure of choice phenomena could be demonstrated in a consistent manner. These early studies were "bottom-up", in that they were exploratory rather than designed to test a specific theoretical prediction, that is, they

were phenomena-led. The studies reported in this chapter demonstrate a moderate, robust, predictable context effect.

Chapter 4 reports three studies that draw heavily on existing theoretical accounts of context effects, to evaluate similarities and differences between these and the lure of choice. Particular attention is paid to the well documented asymmetric dominance effect. These studies rule out the possibility that the lure of choice effect is simply a further illustration of the asymmetric dominance effect, that is, it is a new phenomenon in its own right.

Chapter 5 describes and evaluates three further studies that test the robustness of the lure of choice in more detail and in different contexts. One of these was a version of the well-known Monty Hall decision problem and the others were replications and developments of a recent judgment and decision making study which apparently contradicts the lure of choice. The lure of choice is demonstrated convincingly in all three studies. On the basis of these studies, evidence is presented to suggest that one of the mechanisms underlying the lure of choice is the motivation orientation of the decision maker.

Finally, Chapter 6 brings together the overall findings of the research programme. It highlights the main conclusions to be drawn from all ten studies, and details how the research programme and the underlying theory evolved over the course of the research programme, including addressing the individual studies' potential limitations. The final chapter revisits the research questions outlined above, and assesses the extent to which the empirical studies and the extant literature on which they were based can answer them. This chapter also offers an evaluation of the practical implications of the lure of choice and in doing so, future directions for research are outlined. Overall, the final chapter summarises the contribution of this work to the field of judgment and decision making.

Chapter 2. Literature Review

"My mother's menu consisted of two choices: Take it or leave it." Buddy Hackett (1924- 2003)

2.1. Introduction

The overall aim of this chapter is to locate the current research within the judgment and decision making field, and to provide a theoretical foundation for both the programme of empirical studies reported in the following chapters and the theoretical discussions and conclusions that lead from them.

There are generally accepted to be three approaches to the study of judgment and decision making: How should we evaluate thinking and decision making? (normative question); How do we think or decide? (descriptive question); What can we do to improve our thinking and decision making, both as individuals and as a society? (prescriptive question). The relevant emphases on these continually shift as the field of judgment and decision making matures and develops. This thesis initially focused on the middle question and went on to addresses the latter. However, as the normative standard of rational decision making is nearly always used as a benchmark against which to evaluate the descriptive element of decision research, it is important to describe this approach as background material.

This chapter first provides a brief outline of normative decision theory and behavioural decision theory in order to place the current work in the historical context of the field. Brief consideration of decision under uncertainty includes an introduction to normative theories of decisions under uncertainty (expected utility theory) and a description of commonly observed behaviour, such as neglect of probability and preference reversals. Attention is then focussed on decision behaviour under conditions of certainty, in particular, the wide range of phenomena

known as context effects, which consistently demonstrate violations of normative principles. As the practical implications of judgement and decision making research are fundamental, where appropriate each of these sections is illustrated by relevant research from the consumer decision making context. Following this, research that explicitly addresses when and why humans and other animals demonstrate a preference for choice or non-choice is addressed.

2.2. Normative theory of decisions under uncertainty

Normative decision theory has its roots in the reasonable assumption that people decide by determining which option, or particular course of action, offers the most desirable payoff, be that maximum benefit or minimum loss, i.e. value maximisation. To put it another way, Baron (2000) described the "best" decision as one that most helps one achieve one's goals. However, there is often conflict associated with the attractiveness of such a goal and the probability with which it might occur (that is, the most desirable outcomes can often be highly unlikely). One way in which such conflict might be unravelled is by considering the *utility*[2] of the outcome (the extent to which an outcome goes some way towards achieving our goals). The normative model of decision making suggests that we should try to maximise our utility by selecting options that lead to the greatest utility, whilst taking account of the probability of that option leading to the highest utility outcome, if that outcome is uncertain. In its most general form, however, utility theory is incomplete; it assumes that we have all possible options at our fingertips, along with all the

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[2] Utility does not necessarily mean pleasure, happiness, money or satisfaction. It may be better expressed simply as "goodness" (Broome, 1991). Hsee (1999) suggested that people often do not select the option that would give them the best consumption utility because they are swayed by the option that has the greatest monetary value ("Hedonomics"). Happiness relies more on change in state than absolute value of wealth (Hsee, 2004; Hsee & Hastie, 2006).

evidence we require in order to evaluate them. It does not address the fact that we may have to search out information so that we know everything we possibly can before making a choice.

2.2.1. Expected utility theory

Bernoulli (1738, reprinted 1954) laid out the foundations of utility theory in its modern form. Until the early 1950s it was essentially the domain of economists, but after von Neumann and Morgenstern's (1947) book *Theory of Games and Economic Behavior*, psychologists began to take an interest that was to persist until the present day. It is accepted by many psychologists that expected utility theory (EUT), while not necessarily descriptive (people do not consistently act as if adhering to the tenet of value maximisation) can be considered a valid normative theory of decision making, against which our "irrational" decision behaviour can be compared.

For choosing between simple monetary gambles, the tradeoffs between utility and probabilities are accounted for by the *expected value* of each option: for example, the expected value of a gamble can be calculated by multiplying the probability of a particular outcome by the payoff:

$$EV = \Sigma_i \, pi \, . \, vi$$

where EV stands for expected value; i represents all of the different outcomes; pi is the probability of the ith outcome; vi is the value of the ith outcome. The expected value of an option is therefore the sum of the products of the likelihood and value of all possible outcomes associated with that option, and the option with the highest EV ought to be chosen.

Similarly, if a measure of utility[3] can be apportioned to an outcome (on any scale that is used consistently) we can calculate the expected utility of an option:

$$EU = \Sigma_i \, pi \, . \, ui$$

In this case EU stands for expected utility; i represents all of the different outcomes; pi is the probability of the ith outcome; ui is the utility of the ith outcome.

As a normative, rather than prescriptive account, we do not calculate such utilities for everyday decisions, rather we often rely on "prescriptive rules of various sorts, including rules of personal behavior and rules of morality" (Baron, 2000, page 231). The better the prescriptive rule, the closer the eventual decision to the outcome as would be determined by EUT.

There are a number of arguments that offer support for EUT as a normative theory from a principles (or axiomatic) perspective (de Finetti, 1937; Krantz, Luce, Suppes & Tversky, 1971; Ramsey, 1931; Savage, 1954; von Neumann & Morgenstern, 1947). The four main principles articulated by Kahneman and Tversky (2000) to which EUT must comply if it is to claim normative status are:

Firstly, *the sure thing principle* or *cancellation* (Savage, 1954): this refers to the cancellation or elimination of any state of the world that yields the same outcome regardless of one's decision. Thus, for example, if A is preferred to B then the prospect of winning A if the bonus ball in the National Lotto is an even number (and nothing if it is an odd number) should be preferred to winning B if an even number is drawn. The two prospects yield the same outcome (nothing) if an odd number is drawn, and hence this factor (consideration of the Lotto bonus ball) should be cancelled from the deliberations. In other words, in terms of the EUT formula, it is

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[3] As a slight aside, the utility of wealth is not the same as its monetary value — it depends on how much an individual has. Bernoulli (1738, reprinted 1954) noted that

logical to ignore the common term in both outcomes. However, this assumption has been challenged by many theorists (e.g. Allais, 1953; Ellsberg, 1961), who have illustrated that decision makers often do not adhere to this axiom of rational decision theory.

Secondly, *weak ordering effect*: two (or more) things can always be compared in terms of "betterness", or utility, even if we would not ordinarily compare such things in real life: either you prefer A over B, B over A or are indifferent between them. This potential comparison is known as a *reasonable idealisation*. Furthermore, our preferences must be *transitive*, in that if we prefer X to Y, and Y to Z, we must prefer X to Z. The assumption of transitivity, which holds for both risky and riskless choice is necessary and sufficient for the representation of preference on an ordinal utility scale.

Thirdly, *dominance:* this principle of rational decision making posits that if one option is better than another in one state and at least as good in all other states (i.e. it dominates the other) it should be chosen.

Finally, *invariance* or *extensionality* (Arrow, 1982): put simply, this axiom states that different representations of the same problem should yield the same preferences. To this end, the preference between options should not depend on how they are described, so long as they are described accurately. According to Kahneman and Tversky (2000), if these four axioms are followed in a person's decisions, it can be assumed that the person will follow EUT.

Closely related to theses principles, and essentially equivalent to the assumption that the decision maker has a complete preference order of all options, the rational property of *independence from irrelevant alternatives* (IIA) states that if

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the value of winning or losing a small amount of money is less for a wealthy person than for a poor person..

option A is chosen at least as often as B in a binary choice set, then A should also be chosen as least as often as B when a new option is added to form a triadic set. This principle is flouted by a number of context effects, to be discussed in Section 2.5. Tversky developed the Elimination by Aspects (EBA) model to explain this effect (Tversky, 1972a; 1972b). EBA means that a decision maker will identify the most important criterion for their decision (e.g. the picture resolution quality price of a new television), decide on an appropriate cut-off value and any alternative that falls below this cut-off will be eliminated from the choice set. The next most important criteria is then considered (e.g. screen size) and the process repeated until only one option remains.

A weak version of the principle of irrelevant alternatives, and one that applies to aggregate data rather than individual preferences, is the *regularity condition* of choice, according to which the market share of an option cannot be made larger by adding options to the choice set (Shafir, Simonson & Tversky, 1993; Tversky & Simonson, 1993). The regularity condition states that the proportion of times A is chosen from the choice set {A, B, C} cannot exceed the proportion of times it is chosen from the choice set {A, B}. As will be demonstrated, the lure of choice (as defined in Chapter 1) can lead to violations of the regularity condition of choice. Ultimately, from an economic or classic expected utility theory perspective, the greater the choice the better it is for the individual as consumer. This assumes the larger the assortment to choose from, the greater the probability that one will find the perfect match between the consumer's preferences and the characteristics of the choice set (see Lancaster, 1990, for a review). The approach that is described next adopts a very different perspective.

2.3. *Descriptive theory of decision making - Behavioural decision theory*

In contrast to EUT, behavioural decision theory (BDT) has a rather short history. It builds on the order-imposing nature of normative theory, to study how people *actually* make decisions, rather that how they *ought* to. Rather than invalidating expected utility theory, these violations simply throw up interesting questions of how the model should be interpreted in particular situations.

In 1954, Ward Edwards introduced behavioural researchers to the work of von Neumann and Morgenstern (1947), and since that time, much behavioural research has focussed on the *subjective* counterparts of "objective probability" and "objective value" called subjective probability and subjective value. Hence, when a person has only his or her subjective probabilities to rely on, and his or her utilities are in line with the objective values of the outcomes, Edwards identified the resultant computations as a subjective expected value (SEV) model. When a person relies on their own probability judgements and their values are not in line with the objective values, the computations constitute a subjective expected utility (SEU) model. The SEU model is a wholly psychological model (i.e. there are no observable objective measures), and hence of great interest to behavioural researchers.

The original driving agenda of behavioural decision theory was to examine the non-correspondence between actual unaided human decision-making and the prescriptions of normative theory. Systematic differences between what people *should* do and what they actually do were originally interpreted as reflections of people's cognitive shortcuts and systematic processing errors. More recently, much greater emphasis has been placed on the functionality of systematic shortcuts in human decision processing (for example, "fast and frugal" heuristics, Gigerenzer, Todd & the ABC group, 1999; Goldstein & Gigerenzer, 2002). This functional view of decisional shortcuts will be examined in more detail in Section 2.7.

2.4. Revealed versus constructed preferences

Some of the main differences in terms of underlying assumptions regarding human decision processes between expected utility theory and behavioural decision theory approaches can be broadly characterised by the *revealed* and *constructed* views of preference. When people are asked to report their preference for one item out of a set, or to record their general preference for any single item, a common view (generally favoured by economists studying normative decision theories, see McFadden, 1981; 1999), is that well-defined preferences exist for most items and the task of the researcher is to simply *"reveal"* those preferences. This viewpoint has been likened to an archaeological process; in other words, uncovering something that may be obscured, but is believed to exist nonetheless (Gregory, Lichtenstein & Slovic, 1993). It is often assumed that people know their preferences and that they have the ability or skill to identify (or calculate) the option that maximises received value, and will choose accordingly. As described above, this belief underlies the expected utility theory approach.

However, an increasing number of researchers, particularly behavioural decision researchers and consumer decision researchers, believe that the assumption of well articulated preferences is only tenable in situations where the respondents are familiar and experienced with the object of evaluation. This alternative viewpoint argues that decisions are less a function of preconceived preferences than of an evolving state in which preferences are constructed. From this perspective, many opinions or evaluations are *constructed* (rather than revealed) at the point at which a judgement is requested (see for example Bettman, Luce & Payne, 1998; Fischhoff, 1991; Griffin, Liu & Kahn, 2005; McFadden, 1999; Payne, Bettman & Johnson, 1992, 1993; Payne, Bettman & Schkade, 1999; Slovic, 1995). Gregory et al. (1993)

compared this approach to a form of architecture, whereby the respondent builds a coherent and "defensible" set of values on the spot rather than retrieve those stored in memory.

According to Wells and Iyengar (2006) people are motivated to pursue internal consistency over time, which can lead to an illusion of preference consistency in which their beliefs in the stability of their preferences are sustained despite actual malleability in their revealed preferences. This is achieved by unconsciously distorting memories of previously stated preferences to match current preferences, and considered to be a cognitive coping mechanism related to reduced negative affect and increased desirable outcome measures.

Two major tenets of the constructed perspective of preferences can be articulated. First, expressions of preference are generally constructed at the time the valuation question is asked. Second, the construction process will be shaped by the interaction between the properties of the human information processing system and the properties of the decision task. More specifically, as a result of considerable work by behavioural decision researchers (discussed in greater detail later in this chapter) there is strong evidence to suggest that:

a. Preference amongst options is *context dependent*. The evaluation of an item depends not only on its inherent and described characteristics, but also on the characteristics of the other options of the choice set within which it is presented. Section 2.5 considers a number of the most enduring and relevant context effects in more detail.

b. Preference amongst options depends on the way in which a valuation question is asked. In other words, depending on the item, preference reversals can occur due to response mode effects (Grether & Plott, 1979). For example, in one study, Slovic, Griffin and Tversky (1990) found a high degree of

preference reversal for gambles when asking people to make a selection compared with asking them to assign a contingent weighting value, but far less of a preference reversal for goods.

c. Evaluations of options can systematically vary due to the way in which the choice set is presented or described to participants. When objectively identical items are presented to participants in different formats it can lead to preference reversals. For example, whether an item is evaluated on its own, or jointly with a competing alternative can affect people's preferences (e.g. Hsee, 1999; Hsee & Leclerc, 1998; Hsee, Loewenstein, Blount & Bazerman, 1999). An example with consumer goods illustrates the point: Nowlis and Simonson (1997) found that easily comparable criteria such as price were weighted more heavily in decision (i.e. joint evaluation) situations, whereas less easily comparable "enriched" attributes (e.g. brand name) were weighted more heavily in separate evaluations. There are clear implications for the elements of the marketing mix such promotions and advertising: consumers are relatively more likely to purchase high (perceived) quality, high price brands when they are displayed separately, rather than next to their competing options and vice versa for low quality, low price brands.

d. The complexity of the task will affect the process used to make a decision (for example by greater reliance on decision heuristics as the complexity of the task increases). In most tasks, including consumer tasks, when faced with more complex (multiple-alternative) decision tasks, people tend to use non-compensatory strategies, such as elimination-by-aspects (Tversky, 1972a, 1972b; Lussier & Olshavsky, 1979; see also Payne, 1976).

In consumer decision making, the impact of the product assortment on individual decision processes has been shown to be moderated by the degree to which a consumer has articulated attribute preferences (Chernev, 2003b). In a series of experiments Chernev showed that individuals with an articulated preference were more likely to choose from larger assortments than those without readily available attribute combination. The explanation suggested is that as the size of the choice set increases, so does the complexity of the decision task; those without an articulated ideal are faced with the joint task of evaluating the alternatives, whilst at the same time forming the criteria to be used in that evaluation. It is argued that this increase in task complexity is likely to lead to people without an articulated attribute preference avoiding making selections from larger sets, and showing a preference for selecting from a smaller assortment.

In the language of the revealed versus constructed dichotomy, this thesis adopts a constructed preference approach, and is concerned primarily with the first of the propositions outlined above, i.e. context effects, although many of the reported findings are also conditioned by the other three propositions. The following section elaborates on a number of context effects which have been described in the judgement and decision making literature and which are relevant to the lure of choice.

2.5. Context effects

Inconsistencies in behaviour that result in observable preference reversals from ostensibly the same choice set under differing conditions are usually accepted as being influenced by features of the decision situation, and hence they are known as context-dependent preferences or context effects. This section introduces the most common context effects that reliably flout the rational principles of expected utility

theory outlined above. Following this, theoretical explanations which are most relevant to the lure of choice are evaluated.

2.5.1. The similarity effect (or substitution effect) (see Figure 1)
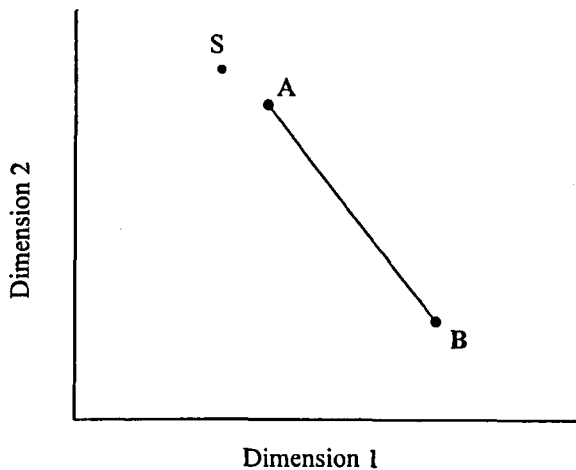
Figure 1. The similarity effect.

If a new item (S) is added to a set that already contains two dissimilar items (A, B) and the new item is similar to one of the existing items (here, the target option, A), its introduction has been shown to reduce the probability of people choosing the similar option (Bettman, Johnson & Payne, 1991; Sjoberg, 1977; Tversky, 1972a, 1972b; Tversky & Sattath, 1979). The new item appears to steal market share from *similar* products and violates the proportionality principle, which assumes that new items takes from others in proportion to their original share (Luce; 1959). The reversal of preference is shown when $Pr[A \mid \{A, B\}]$ (the probability of choosing A from a set of A and B) $> Pr[B \mid \{A, B\}]$ but $Pr\,A \mid \{A, B, S\}] < Pr\,B \mid \{A, B, S\}]$, where S, the new item, is similar to A. A negative similarity effect has been called the substitution or classic detraction effect and states that the probability that an option will be chosen from a set decreases with increases in its similarity to

other options (Luce, 1959; McFadden, 1981; Tversky, 1972a, 1972b). The similarity effect violates the principle of independence from irrelevant alternatives.

2.5.2. The compromise effect (see Figure 2)
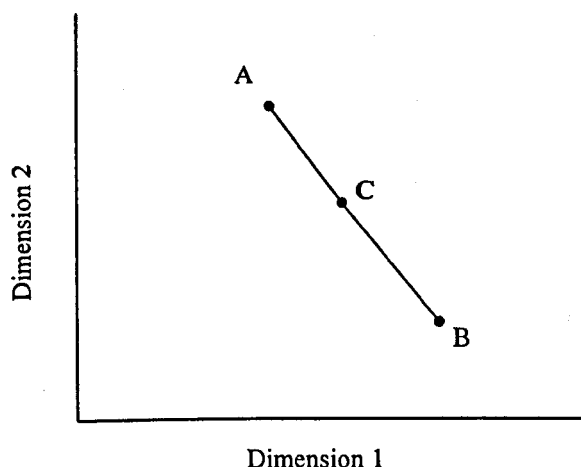
Figure 2. The compromise effect.

Imagine there are three equally attractive options: A, B and C, and A and B are extremely different from one another and C is a compromise that lies between the two extremes. The compromise effect is demonstrated when all three options are presented together, and the compromise item is chosen more frequently than either of the two extreme options (Simonson, 1989; Simonson & Tversky, 1992; Tversky & Simonson, 1993; see also Dhar, Menon, & Maach, 2004; Kivetz, Netzer & Srinivasan, 2004a; Sheng, Parker & Nakamoto, 2005). This is found whether or not the trinary set is presented before the binary pairs or not. So, $Pr[A \mid \{A, B\}] = Pr[A \mid \{A, C\}] = Pr[B \mid \{B, C\}]$ but $Pr[C \mid \{A, B, C\}] > Pr[A \mid \{A, B, C\}]$ and $Pr[C \mid \{A, B, C\}] > Pr[B \mid \{A, B, C\}]$. The compromise effect is yet another violation of the principle of independence from irrelevant alternatives.

A good example of the compromise effect is the breadmaker once offered by manufacturer Williams-Sonoma, priced at $275, rather more expensive than the existing models on the market. Initially sales were satisfactory but not particularly remarkable. However, Williams-Sonoma later offered a second breadmaker that was much larger and much more expensive than the first. While the new model did not sell very well, adding it to the product line almost doubled the sales of the original one, which now seemed to be a bargain (Kardes, 2002). In terms of consumer goods, the likelihood of buying a higher price, higher quality item can be enhanced by introducing an even higher price, higher quality item to the subset that consumers consider[4] (Simonson, 1999).

2.5.3. The asymmetric dominance effect (see Figure 3)
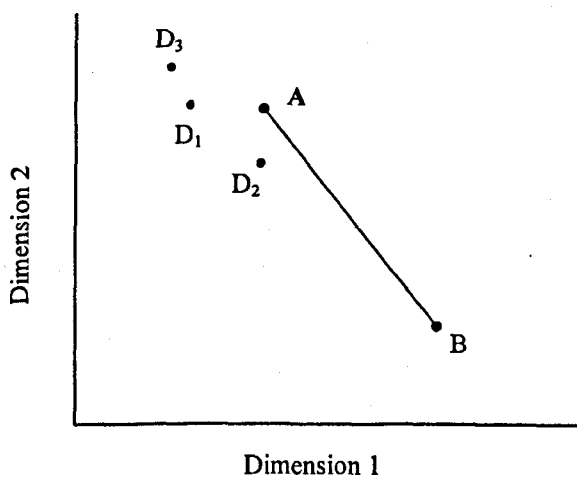
Figure 3. The asymmetric dominance effect (attraction effect) (D$_1$ and D$_2$) and the inferior decoy effect (D$_3$)

The asymmetric dominance effect (ADE), also known as the decoy effect or the attraction effect, first identified by Huber, Payne and Puto (1982, see also

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[4] Except under conditions of time pressure, when susceptibility to the compromise

Ratneshwar, Shocker & Stewart, 1987; Simonson, 1989) is the relationship between adding an asymmetrically dominated alternative to a choice set (D_1 or D_2 in Figure 3) and increases in the attractiveness and selection probability of the dominating option (option A). The dominance is said to be asymmetric when there is another alternative in the choice set that does *not* dominate the added option, in this example, option B.

That is, [Pr A | {A, B}] < [Pr A | {A, B, D_1}] where D_1 is a new item that is dominated by A, but not B. The asymmetric dominance effect violates the regularity principle, in that the addition of an option D_1 to an existing set of options A, B should either leave the probabilities of choosing A or B unchanged (if D_1 is never chosen), or it should decrease these probabilities (if D_1 is sometimes chosen). The introduction of D_1 to a set containing A and B should only decrease the probability of choosing A, not increase it. The same effect has also been demonstrated when relatively inferior alternatives (D_3 in Figure 3) are added to the choice set (Huber & Puto, 1983).

The asymmetric dominance effect has been demonstrated in a number of tasks in a variety of contexts, such as evaluations of job candidates (Highhouse, 1996; Slaughter & Highhouse, 2003; Slaughter, Sinar & Highhouse, 1999), group-based employee selection decisions (Slaughter, Bagger & Li, 2006), physician's decisions about medication (Schwartz & Chapman, 1999) partner selection (Sedikides, Ariely & Olsen, 1999), policy decisions (Herne, 1996), consumer preferences (Heath & Chatterjee, 1995; Heath et al., 2000; Huber et al., 1982; Zhou, Kim & Laroche, 1996), business to business purchases (Dhar et al., 2004; Kivetz, Netzer & Srinivasan, 2004a, 2004b), strategic competition (DeSarbo, Grewal &

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effect is reduced (Dhar et al., 2000).

Wind, 2006) and in-store purchases (Doyle, O'Conner, Reynolds & Bottomley, 1999).

2.5.4. Reference point effects (see Figure 4)
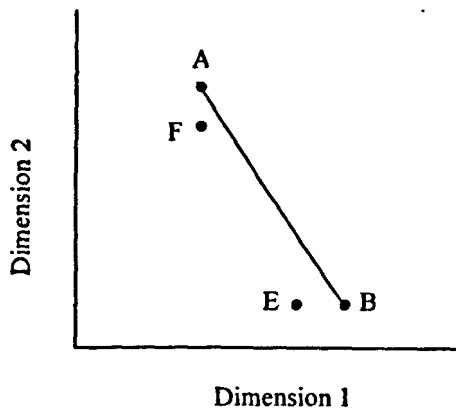
Figure 4. Reference point effect (Tversky & Kahneman, 1991, study 1).

Tversky and Kahneman (1991) and Herne (1998) reported a number of studies designed to test the reference-dependence model of decision making which also demonstrated a clear example of context effects resulting in a preference reversal. Participants in one condition of the task were asked to imagine that they owned item E, and they were able to keep that item, or choose item A or B. Point E becomes their reference point, and in fact is rarely chosen by participants. Option B (small advantages over reference point E on dimension 1 and no difference on dimension 2) was strongly favoured over option A (large advantages over E on dimension 2 and large disadvantages on dimension 1). The preference reversal is demonstrated when option F was offered as the original endowed option – participants rarely chose to keep this, but the preference for option A was significantly greater than for option B. It appears that the marginal value of both losses and gains decreases with their distance from the reference point.

2.5.5. Combined context effects

Huber and Puto (1983) argue that the substitution effect (negative similarity effect) and the attraction effect are not mutually exclusive and in conjunction can account for behaviour in different choice sets. In their 1982 paper, Huber et al. used a decoy option that was dominated by the target. The decoy itself was chosen less than 2% of the time. Hence, no substitution effects were demonstrated (i.e. simple attraction effects only). However, in this paper they asked what would happen if an attraction effect occurs in conjunction with a substitution effect, as would happen if the decoy was inferior, but also viable (inferior in an absolute sense, but without knowing the participants' utility function). Based on the previous descriptions of the effects, one might predict that substitution would hurt similar alternatives, and attraction would help them, thereby suggesting a confounding of the effects, and perhaps outcomes would be approximated by proportionality (hence, on the surface, following rational principles). In two studies, selections were made between a target, a competitor and a decoy that varied on three dimensions, and in one study selections were made between four alternatives (decoy, target and 2 competitors) that varied on three dimensions. A number of interesting findings emerged, including: the market share of the competitor remained roughly equal regardless of the quality of the decoy; as the decoy becomes stronger, its share increases relative to that of the target (i.e. evidence of a strong, but local substitution effect); adding a new extreme item appears to draw preference in its direction (i.e. evidence of an attraction effect). These combined results suggested:

> "a two-stage attraction-substitution process to account for choice in the face of changing market boundaries as new brands are added. The first stage involves an attraction effect, reflected in an increase in utilities near the new brand. The second stage entails a substitution effect, which takes share

primarily from those items closest to the new item" (Huber & Puto, 1983, page 36).

In other words, this could describe a global attraction effect but a local substitution effect. This idea of sequential process is a theme that emerges in many aspects of decision making, and is returned to in later chapters.

2.5.6. Disjunction effect

Whilst investigating the process of reason-based choice (to be reviewed more fully shortly) Tversky and Shafir (1992a, 1992b) conducted a number of studies that showed that the disjunction of different reasons for a decision ("a or b") is often less compelling than either definitive reason "a" or "b" alone. The actual scenario they used concerned whether or not participants said they would book a bargain holiday or defer the option for a couple of days. Those in the disjunctive condition would find out if they had passed an important exam until the following day (i.e. they had either passed or failed) and those in the definitive conditions had been told that they had already either passed or failed. Those that had already been told the outcome of the exam (*regardless* of whether they had passed or failed) were far more likely to book the holiday there and then than those who did not yet know, who were more likely (61%) to pay to be able defer the decision until they found out the result of the exam. In the event, the actual outcome of the exam had no substantive effect on their choice behaviour, but it appears that people were willing to pay for non-instrumental information, perhaps as it gave them a definitive reason for their decision.

2.5.7. Splitting effects

Another phenomenon possibly related to the lure of choice has been variously described as subadditivity or event-splitting effect (Fischhoff, Slovic & Lichtenstein,

1978; Humphrey, 2001a, 2001b; Read, Antonides, van den Ouden & Trienekens, 2001; Rottenstreich & Tversky, 1997; Starmer & Sugden, 1993). In event-splitting, the weight of an attribute is increased if it is divided into parts and each part evaluated separately, compared with a single evaluation made of the whole. To illustrate, imagine an urn filled with 100 numbered balls. People will judge a prospect more attractive if it is described as two possible outcomes - a gain of £100 if one of the balls numbered 1 to 25 are drawn, and a gain of £100 if one of the balls numbered 26 to 50 are drawn, than if it is described as a single outcome – a gain of £100 if one of the balls numbered 1 to 50 are drawn. Dividing the chances into two groups apparently makes them more salient. The similarities between splitting effects and the lure of choice will be discussed in later empirical chapters (notably Section 3.7.)

Other context effects are reported in the literature but this review has been restricted to those with the most relevance to an investigation of the influence of increased range of options on decision making behaviour. The next section considers some of the most influential theoretical accounts of the aforementioned context effects.

2.6. Theoretical accounts of context effects

A particular focus for theoretical accounts of context effects is explaining the asymmetric dominance effect. Range, frequency, and trade-off explanations have been offered as explanations of the asymmetric dominance effect and inferior decoy effects (for example, see Ariely & Wallsten, 1995; Busemeyer, Barkan, Metha & Chaturvedi, in press; Herne, 1996, 1998; Huber et al., 1982; Wedell, 1991; Wedell & Pettibone, 1996). Extremeness aversion is said to explain the compromise effect. The explanation that bears closest resemblance to the explanation offered in this

thesis for the lure of choice is the emergent value explanation, whereby decision heuristics such as a dominance-seeking are employed (Herne, 1996).

2.6.1. Range-increasing account

A range-increasing mechanism has been offered as an explanation for the asymmetric dominance effect (Huber et al., 1992). An alternative such as D_1 in Figure 3 (Section 2.5.3) increases the range of the dimension on which the target is weakest (in this case, dimension 1) and can lead to a subjective value shift on this dimension (Parducci, 1974), therefore decreasing the psychological experience between the target (A) and the competitor (B) on this dimension. Wedell (1991) noted that this is in line with an additive difference model (Tversky, 1969), where an increase in the range of variation on a dimension is inversely related to the weight afforded it. The concept of loss aversion (Tversky & Kahneman, 1991) may underlie a range-increasing explanation of the asymmetric dominance effect. That is, as Simonson & Tversky (1992) explained, when an asymmetrically dominated alternative is introduced to the set it becomes an influential reference point and the target will be selected as it does not suffer as much loss as the competitor option. This loss aversion explanation has received empirical support from other researchers (Herne, 1998; Highhouse & Johnson, 1996). Increasing the range on the weaker dimension caused the strongest asymmetric dominance effect for Huber et al. (1982). However, their results did not demonstrate a relative increase in the strength of the effect with a more extended range, and furthermore, the same effect has been found when there is no stretching of range (Wedell, 1991).

2.6.2. Frequency-increasing account

A different mechanism potentially underlying the asymmetric dominance effect suggested by Huber et al. (1982) is a frequency-increasing explanation (or weight change model, Wedell & Pettibone, 1996). The inclusion of a decoy such as D_2 in Figure 2 (Section 2.5.2) adds an additional level between the target A and the competitor B on the dimension on which the target is stronger (dimension 2). This leads to an increase of the subjective weighting of this dimension, and hence would predict a preference for the target option. However, in general, this explanation has only weak empirical support (Huber et al., 1982; Wedell & Pettibone, 1996).

2.6.3. Emergent value account

An alternative explanation to range or frequency accounts is offered by an emergent value approach (Pettibone & Wedell, 2000; Wedell & Pettibone, 1996). Participants may employ dimension-wise heuristics to make their selections, relying rather more on qualitative comparisons, such as the dominance of the target, because for example, it is easier to justify or explain on this basis. This is described as dominance-valuing by Wedell (1991). Pettibone and Wedell's three studies on compromise decoys, inferior decoys and phantom decoys which actually dominate the target, but are not available for selection (Pratkanis & Farquhar, 1992), suggested that models of decision process need to take into account aspects of the choice set that go beyond dimensional weights and values. The emergent value explanation was the only one in their set of studies that was able to predict significant decoy effects across all types of decoy. This explanation also bears some relation to a theory of dynamic choice reconstruction (Ariely & Wallsten, 1995). Based on the idea of dominance seeking, it is suggested that participants actively seek ways to simplify the task. Using *subjectively* dominated alternatives rather than objectively

asymmetrically dominated ones, the authors suggested that the relationship between an inferior (but not dominated) alternative and the target affects not only the weights of the different dimensions but also the *overall* subjective values of the different options.

2.6.4. Reason-based choice and the pursuit of useless information

Related to the idea that people take into consideration more than just the relative levels of particular dimensions is the well-established concept of reason-based choice (Shafir et al., 1993; Simonson, 1989; Tversky & Shafir, 1992a; see also Chernev, 2005; Park & Kim, 2005; Simonson, 2005). The holiday package (Tversky & Shafir, 1992b) used to illustrate the disjunction effect discussed in Section 2.5.6 is an example of reason-based choice - whether a person had passed or failed the exam had no differential consequences on decision making, but people were willing to pay for extra information that gave their selections "justifiability". Closely related to the mechanisms underlying the emergent value account for context effects, reason-based choice can be described as:

> "the hypothesis that people do not choose between equated alternatives at random. Instead they resolve the conflict by selecting the alternative that is superior on the more important dimension, which seems to provide a compelling reason for choice" (Shafir et al., 1993, page 32).

Shafir et al. compared triadic choice conditions in which the options included dominating items and conflicting options and found that participants' tendency to search for additional options was greater when the choice among alternatives was harder to rationalise (i.e. conflicting), than when there was a compelling reason and the decision was easy (i.e. the target dominated another option). Such findings are inconsistent with the principle of value maximisation - people should search, if and

only if, the expected (subjective) value of searching exceeds that of the best alternative currently available. The best alternative offered in the dominance condition was also available in the conflict condition, and therefore value maximisation implies that the percentage of participants who seek an additional alternative cannot be greater in the conflicted than in the dominance condition (the regularity condition) which, in fact runs contrary to the observed data.

To take this one step further, people will often pursue information that is non-instrumental to a decision (and postpone deciding), and then come to treat it as instrumental (Bastardi & Shafir, 1998, 2000; Redelmeier, Shafir & Aujla, 2001). Bastardi and Shafir (1998) asked students whether they would register for a popular course, knowing that an unpopular professor was taking it rather than an excellent one. Most (82%) said yes. When it was not certain who would teach the course, half wanted to wait until they found out. On discovering it was the unpopular professor, fewer registered overall (71%). Even though the identity of the professor was of little consequence in the simple case, people chose to use that information in the more complex, two stage case. Similar results were found with a number of other scenarios, including approving mortgage applications and accepting college applicants. Waiting for "good news" compared to "bad news" seemed to have different effects: bad news tended to lead to accepting the status quo, good news led to a tendency to depart from it.

Bastardi and Shafir also contemplated the pursuit of information and the time course of decision, arguing that "the ultimate decision is typically made only after information is obtained, but preferences may be formed either before or after one opts to wait for the information". This suggests that either preferences are constructed when the potential outcomes are contemplated (and not when the information is actually received), or people wait, not because they perceive the

missing information to be instrumental, but for some other reason: e.g. to appear responsible or conserve cognitive effort by avoiding having to contemplate what their preference would be under each scenario. Their results supported the latter suggestion, in that people pursue information when it is not costly and seems relevant. Unfortunately, this also sometimes applies to information that is non-instrumental.

Reason based choice can help explain violations of the principle of irrelevant alternatives. Put simply, as Simonson (1989) found, when participants were told they had to explain and justify their decisions, explicit dominance seemed to give targets "justifiability".

2.6.5. Trade-off contrasts

Trade-off contrast effects occur when the tendency to prefer an alternative is enhanced or hindered depending on whether the trade-offs within the set under consideration are favourable or unfavourable to that alternative (Simonson & Tversky, 1992; Tversky & Griffin, 1991). The trade-off contrast explanation has been offered to account for the asymmetric dominance effect and the relatively-inferior decoy effect. It is based on the assumption that the well-established contrast effects that are known to affect perceptual judgements also apply to decision making. For example, an apple will look bigger when surrounded by smaller apples than when surrounded by big ones. By the same token, a trade-off seems better when surrounded by relatively poor trade-offs than when surrounded by good ones. Hence, in Figure 3 (Section 2.5.3), trade-offs between A and B alone on dimensions 1 and 2 do not particularly favour either option (assuming both dimensions are equally important). However, when D_3 (the relatively inferior decoy) is added to the mix, the trade-off looks more advantageous to A, because of the relatively poor B-D_3

trade-off: comparing a move from B to A or from B to D_3 reveals that the latter is less attractive, because much more had to be given up on dimension 1 and only a little more is gained on dimension 2. The same explanation can be applied to the asymmetric dominance effect, in that a move from B to A is more attractive than a move from B to D_1 because in the former less is lost on dimension 1 (and the same amount is gained on dimension 2). The experimental support for the trade-off contrast explanation is rather ambiguous (Herne, 1996). For example, using the reasoning above, one might expect that as the contrast between the decoy and the competitor alternative increases, the less the inclusion of this decoy will favour the target. This predicted relationship was not found in the different decoys manipulated by Huber et al. (1982). A similar explanation for similarity effects was offered by Mellers, Chang, Birnbaum and Ordonez (1992) and Mellers and Biagini (1994).

2.6.6. Extremeness aversion

Simonson (1989) showed the introduction of an extreme option reduced the "market share" of other extreme options, but not options which were considered moderate by comparison. Simonson and Tversky (1992) suggested that extremeness aversion can explain the compromise effect. It is argued that within any offered set, options with extreme values are relatively less attractive than those with intermediate values, evaluated in terms of advantage and disadvantages relative to a neutral reference point, and assuming that losses loom larger than gains (the underlying tenets of prospect theory - Kahneman & Tversky, 1979).

This part of the literature review has reviewed a number of context effects in decision making and located them within the behavioural decision making literature, relative to the normative/descriptive and revealed/constructed preference approaches.

The studies presented in Chapter 4 of this thesis were designed to explicitly test whether the lure of choice (demonstrated in the exploratory studies reported in Chapter 3) is simply a demonstration of an asymmetric dominance effect. Although there are some similarities between the lure of choice and the asymmetric dominance effect, and the theoretical explanations reviewed above have some relevance to the current work, it becomes clear that something fundamentally different is going on. Studies 5 to 10 specifically explored whether people's behaviour is influenced by choice *per se,* rather than by the dominance of the target alternative as the asymmetric dominance effect would predict. In terms of theoretical accounts, range and frequency explanations will be shown to be inadequate to account for or predict the lure of choice, but explanations in terms of an emergent value approach are more promising.

2.7. The use of heuristics

As mentioned previously, we often rely on the use of decision heuristics or simplification strategies to make what we consider to be non-straightforward decisions. Even a simple decision like buying a jar of coffee can be overwhelming: for example, one online supermarket offers 98 different coffee products, ranging from instant coffee granules to espresso coffee beans. The customer must decide not only what kind of coffee to choose, but also decide on features such as the coffee's strength, the size of the jar, its place of origin and whether to spend a little more on a "fair trade" product.

Despite this complexity, however, few consumers spend more than a moment or two when they decide which coffee to buy. Because this is not enough time for them to explicitly compute the importance of each option, they must be doing something else. When making complex decision, such as those with multiple

alternatives or numerous attributes, or when under time pressure, people simplify the task and ignore a lot of information. One kind of simplification is to switch from compensatory to *non-compensatory* decision strategies. That is, rather than evaluating *all* options of a choice set on *all* the appropriately-weighted criteria and allowing a high score on one criterion to compensate for a low score on another, people rely on strategies where a high score on one criterion cannot compensate for a low score on another. Non-compensatory strategies rely on the use of heuristics, which are cognitive rules of thumb that help simplify the decision.

One non-compensatory strategy is elimination-by-aspects (EBA, Tversky, 1972a, 1972b). In this strategy, consumers consider options attribute by attribute, starting with the most important attribute, and eliminate options that do not do meet a standard. To illustrate, imagine that price is the most important attribute for a consumer and coffee strength the second most important. They might reject all coffees costing more than £2.00, and if more than one remains, then reject all coffees with a strength less than '3.' Once that is done, if there are still more coffees in the running they will choose another attribute and continue the process until only one coffee remains. This process is cognitively simple because the decision maker only considers a subset of attributes and never has to make explicit tradeoffs among them. Of course, the process also neglects a lot of information and might make apparently arbitrary decisions, such as ruling out a coffee that costs £2.05 but which tastes ten times as good.

Although simplification strategies like these, where options are considered on an attribute by attribute basis, might be ideal when all the options are viewed simultaneously (as on a supermarket shelf, and sometimes on web pages), a different strategy might be required when options are presented sequentially or unpredictably and the choice set shrinks with delay, such as when looking for a new home. In this

case, one way to simplify a complex decision is to satisfice (Simon, 1955), which means trying to find a *good enough* option rather than the best. For example, our coffee drinker may have set the *aspiration level* for the main attributes of his coffee as: (a) comes from Latin America, (b) is dark roast. The first coffee he comes across that satisfies these criteria is selected. It may not be the best coffee for the consumer's needs, but it is satisfactory.

Whilst considering only a subset of information will always mean a risk of overlooking something important, decision heuristics (cognitive short cuts) such as satisficing and elimination by aspects allow a consumer to make a selection based on some (if not all) of their important criteria and hence generally reflect their subjective preference. In other words, they can be functional. Other heuristics, however, can cause them to violate the rules of rational decision making or chose something that does not reflect their true preferences. For example, buyer behaviour can be influenced by how easy it is to justify the decision being made (Shafir et al., 1993), discussed earlier this chapter (Section 2.6.4). This can lead to inconsistencies in decisions because the choice context determines what justifications are possible.

It has been common in the past for the literature to assume that the use of heuristics and other simplification strategies is non-rational (in terms of normative theories of decision making) or even dysfunctional (see Bown, in press). If judged by the standards of rationality and optimality, this may be the case, but other authors, notably Gigerenzer and his colleagues (Gigerenzer, Czerlinski & Martignon, 2002; Gigerenzer et al., 1999) have argued that these are not the only guiding concepts for assessing cognition. In particular, simplicity and frugality are also reasonable criteria for evaluating decision strategies, particularly in situations where information available is incomplete.

"These fast and frugal models are justified by their psychological plausibility and adaptedness to natural environments. For example, the real world provides only scare information, the real world forces us to rush when gathering and processing information, the real world does not cut itself up into variables whose errors are conveniently independently normally distributed, as many optimal models assume" (Gigerenzer et al., 2002, page 559).

In support of this argument, fast and frugal heuristics such as "take the best" (choosing on the basis of the cue with the highest validity that discriminates between options) have been shown to be just as good as standard linear models such as multiple regression at inferring the population of various cities (Gigerenzer & Goldstein, 1996).

The next section of the literature review examines existing research that considers the extent to which choice *per se* has an impact on decision behaviour. Preference for choice or non-choice will be reviewed in three main bodies of research: in animals, in humans generally, and in consumer decision making specifically.

2.8. Preference for choice in animals

There have been few studies of whether other organisms are attracted to *choice qua choice*, and none of these have addressed the problem of whether choice can act as a lure. Those studies conducted on animals show that the presence of choice is attractive even if it does not alter the ultimate outcome (see Catania, 1980, for a review). In the first such study, Voss and Homzie (1970) investigated the behaviour of rats choosing between two paths that ultimately led to the same food reward. One path was a direct line to the food, whereas another led to a decision between subpaths that all led to the food. The majority of the rats took the choice route (59 compared with 41). Catania (1975) and Catania and Sagvolden (1980)

replicated this preference pattern in pigeons. The pigeons first had to choose to peck one of two initial response keys: pecking one (*no-choice*) key led to a single key being lit, which they then pecked to receive a reward, while pecking the other (*choice*) led to two keys being lit, either of which could then be pecked for a reward. Although the reward was the same regardless of which initial key had been pecked, the pigeons were more likely to peck the choice key than the no-choice key. For example, in 44 out of the 45 times when a pigeon changed the pattern of its pecking, it was in the direction of a preference for free-choice (Catania, 1975). Ono (2000) found the same preference pattern for pigeons using an intermittent reinforcement schedule.

Suzuki (1999) observed a similar attraction to choice in primates, and found that the attractiveness of choice depended on what the options were. Monkeys chose between a *no-choice* (single option) and a *three-choice* alternative. In one group, two options in the three-choice alternative were identical to the no-choice option and one was worse, while in a second group one option was identical and two were worse. The three-choice alternative was preferred to the no-choice alternative in the first (two identical) condition, but not in the second (two worse) condition. Hence the monkeys appeared to like choice, but only when most of the options in that choice set were favourable[5]. Similar behaviour (demonstrating violation of the regularity condition) has also been demonstrated by jays and bees (Shafir, Waite & Smith, 2002; Waite, 2001a, 2001b).

One shared characteristic of the animal studies by Catania, Homzie, Ono, Suzuki and Voss is that at least one option in the multiple-choice set was identical to that in the no-choice set (and sometimes the set even contained a better alternative).

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[5] Suzuki (1997, 1999, 2000) found that humans were more likely to take a choice alternative when all options it led to were at least equal to the no-choice option.

By opting for the choice alternative, therefore, the participants were not drawn to take a different (and possibly suboptimal) alternative. These studies show that if an animal is offered a choice between A and {A, A} they were more likely to take {A, A}, and then, of course, select A. The only variation on this theme (Suzuki, 1997) was that in a decision between A and {A, A, B}, where A is preferred to B (A ≻ B), participants were more likely to take {A, A, B}. In every case, however, they were able to, and nearly always did, end up taking A, the preferred outcome. Ultimately, there is nothing disadvantageous about this course of action. The present investigation, amongst other things, seeks to answer the question of whether a choice between a single item A and a set of alternatives which does *not* include A, e.g. {B, C} influences people in the direction of choice, and away from their initially preferred option A. Raffa, Havill and Nordeheim (2002) offered evidence to suggest that gypsy moths can, to an extent, meaningfully compare alternatives of this kind. Results with two choice alternatives were statistically significant, but showed somewhat inconsistent differentiation with four choices, and failed to find differences with five choices.

Hutchinson (2005) offered a detailed review of choice preference in animals, specifically in terms of leks (an aggregation of males seeking female mates) and related it to both consumption and performance (in the sense that the selection made is the appropriate one). The male-buffet hypothesis (Wiley, 1991) suggests that females choose better mates through having more choice and being better able to compare potential mates. Hutchinson identified many reasons why this preference for choice may have evolved. For example, visiting a lek reduces travel time within a cluster of males (thus reducing energy expended or risk incurred in her endeavour); larger leks allow more males to be inspected in the same period of time, and hence it is more likely that at least one male will exceed a particular quality level (satisficing

in the terminology of behavioural decision theory); larger leks allow the time saved travelling to be used to spend longer considering each male, hence their assessment is likely to be more accurate; alternatively, previously visited males may be revisited more easily within a lek; the qualities of each male need not be remembered for long periods of time, and indeed competing males may be compared side by side; as a wider sample of males can be inspected in a lek, a more accurate judgment of quality in the overall population can be made; if circumstances change (e.g. a particular animal disappears unexpectedly), visiting a larger lek means that finding a suitable alternative is more likely. According to Hutchinson, similar reasons can account for why cities develop concentrations of particular types of shop such as antiques dealers, estate agents, and restaurants has been proposed by economists (e.g. Chamberlin, 1933). Furthermore, geographers have also used similar explanations for why prostitutes cluster together within red-light districts (Ashworth, White & Winchester, 1988).

Interestingly, in contrast to the generally accepted male buffet hypothesis, after analysing data from black grouse leks Hutchinson (2005) suggested that ultimately, too much choice can lead to poorer performance (choosing a less-than-perfect mate, with which mating success is reduced). To take this to its logical conclusion, although the male buffet hypothesis suggests otherwise, it may not be adaptive for females to have an indiscriminate preference for larger leks, and there may be an optimum size lek that results in the best quality mate. However, the evidence for this conclusion is mixed. In fact, Hutchinson's main conclusion was that there is surprisingly little clear-cut evidence whether or not choice is aversive in animals, and that more research is required to explicate the complex relationship between an individual's preference for choice and the quality of the decision.

2.9. Human preference for choice and non-choice

The studies into the lure of choice were designed to test the assumption that there is something inherently attractive about having choice. This section first reviews research that examines the extent to which people benefit from choice, or at least demonstrate preference for, and seek out increased choice amongst options. The next part of this section considers the literature that adopts the opposite stance: that there are in fact drawbacks and negative consequences associated with having too much choice, and people may try (consciously or unconsciously) to avoid or reduce choice.

2.9.1. Positive consequences of choice and desire for choice

Decades of psychological theory research has repeatedly demonstrated, across domains that a link exists between the provision of choice and increases in intrinsic motivation, perceived control, task performance and life satisfaction. The typical experimental study compares performance and intrinsic motivation between conditions with a choice of a number of activities and one in which the participants are told by the experimenter which specific activity to undertake (e.g. Zuckerman, Porac, Lathin, Smith & Deci, 1978, see also Chua & Iyengar, 2006; Deci, 1975, 1981; Deci & Ryan, 1985; Glass & Singer, 1972a, 1972b; Langer & Rodin, 1976; Lepper, Sethi, Dialdin & Drake, 1996; Rotter, 1966; Schulz & Hanusa, 1978; Taylor, 1989; Taylor & Brown, 1988; Zukerman, Porac, Lathin, Smith & Deci, 1978). There appear to be positive outcomes associated with choice even when those choices are trivial or incidental (Cordova & Lepper, 1996; Dember et al., 1992; Swann & Pittman, 1977). Attribution Theory (Kelly, 1967, 1973), Dissonance Theory (Collins & Hoyt, 1972; Cooper & Fazio, 1984; Linder, Cooper & Jones, 1967) and Reactance Theory (Brehm, 1966) have all been offered as explanations of this relationship.

Most of these approaches assume that even illusory perceptions of choice will have powerful positive effects on perception of control and self determination (Langer, 1975; Lefcourt, 1973; Lewin, 1952). However, much of the research in this area extols the virtue of choice as some inherent (often poorly articulated and defined) attractiveness using anecdotal evidence (see the discussion of the use of terminology of choice, Section 1.1). Furthermore, it also nearly always adopts a westernised (particularly Americanised), ideological perspective. Empirical investigations into human desire for choice are fairly rare.

Some evidence from the field of consumer decision making does exist, mostly building on the economic assumption that more choice is inevitably better for the consumer (Bayus & Putsis, 1999; Kahn, 1998; Kotler, 1991). Developing the work of Broniarczyk, Hoyer and McAllister (1998) and Hoch et al. (1999), Oppewal and Koelemeijer (2005) examined the effects of assortment size and composition on assortment evaluation using a large panel of Dutch shoppers in the cut flower market. They found that an increased range of choice was regarded as better, regardless of similarity of items in the assortment and whether or not the assortment already contains a preferred alternative (Hoch et al.'s "favourite available" effect stated that if a favourite is present, a smaller assortment can be sufficient for satisfying consumers' need for variety).

A further example of preference for choice was demonstrated by Kahn, Moore and Glazer (1987; see also Glazer, Kahn & Moore, 1991), who demonstrated what they called the lone-alternative effect. Participants in their studies preferred a store that offered two types of soda to a store that sold just one variety. In a set of recent studies, Szrek and Baron (2006; in press) showed that not only were people more likely to purchase an insurance plan when they were able to choose it from a pair which included an inferior alternative than when the same policy was presented

as the only option, they were also willing to pay more for the same policy when offered in a pair than when it was the only option available.

Variety seeking in consumer behaviour is a concept closely related to preference for choice. Menon and Kahn (1995) suggested that variety seeking in consumer choice satisfies the desire for stimulation; consumers seek to maintain an optimal stimulation level (Howard & Sheth, 1969; McAlister & Pessemier, 1982; Raju, 1980; Venkatesan, 1973). Boredom or under-stimulation can lead to switching brands, despite no underlying change in preferences. They also found that an increase in positive affect increased the need for stimulation and was related to increased variety seeking. Ratner, Khan and Kahneman (1999) found that individuals choose to switch to less-preferred options even though they enjoyed those options less than they would have enjoyed repeating a more preferred option. Variety seeking can also be observed in one-off decisions – there is a tendency for an individual to switch away from the item consumed on the last occasion (Read & Loewenstein, 1995; Read, Loewenstein & Kalyanaraman, 1999; Read et al., 2001; Simonson, 1990). The behavioural effects of increased choice in terms of consumption have also been examined: Kahn and Wansick (2004) found that assortment structure influenced perceived variety, and in their study of bulk candy stores, they found that the perception of variety, even when illusory, stimulated people to consume more.

Overall, despite an enduring assumption of a human preference for choice in terms of range of options (especially in consumer decision making), actual empirical evidence is limited and therefore provides another rationale for a systematic investigation of the issue.

2.9.2. Negative consequences of choice and avoidance of choice

This section deals first with the outcomes associated with increased choice for humans, including consumer decision making, and then describes the mechanisms that people adopt to cope with too much choice. The final part of this section addresses the two concepts known as choice overload and the paradox of choice.

There is much evidence to suggest that people have great difficulty with decisions as they become more complex (Tversky & Shafir, 1992a). When the size of the choice set increases, the demands on a person's cognitive resources increase, as does the effort required to evaluate the attractiveness of alternatives, potentially leading to cognitive overload (Hauser & Wernerfelt, 1990; Huffman & Kahn, 1998; Jacoby, Speller & Kohn, 1974; Scammon, 1977; Shugan, 1980). It is not only the number of items to be compared within a choice set that lead a decision to be difficult, but also the number of attributes to be compared (see for example, Fader & Hardie, 1996; Fasolo et al., in press; Gourville & Soman, 2005; Malhotra, 1982). However, in the studies presented here, options are only ever described on a maximum of two dimensions, hence it is research considering the number of options available that is of most interest. It has also been suggested that increasing the size of the assortment might confuse people, leading to weaker preferences and decreased likelihood of choosing an option (Chernev 2003a; 2003b; Dhar, 1997; Greenleaf & Lehmann, 1995; Iyengar & Lepper, 2000; Schwartz et al., 2002).

In terms of decision quality, Hayes (1962) consistently found that mean performance on problem solving tasks was significantly higher for four-alternatives problem types as compared to eight-alternative problem types. Wright (1975) stated that a choice of six alternatives was expected to represent the maximum comfortable load, and ten options represented a definite cognitive overload. Likewise, it has been

suggested that for experts, less variety is generally preferred when the requirements are specific and a larger set is preferred for a general need (Johnson & Lehmann, 1997; Van Herpen & Pieters, 2002).

Those studies which have direct relevance to the lure of choice require more detailed consideration. Many of the experiments used in the studies in this thesis required participants to select either a lone option or one contained in some kind of group. Some researchers argue that an item within a group is less likely to be selected than when it is on its own, regardless of its subjective utility, that is, individual options of a group get short shrift (e.g. Posavac, Sanbonmatsu & Ho, 2002).

Brenner, Rottenstreich and Sood (1999) suggested that grouped options will induce intra-group comparisons, rather than inter-group comparisons (due in part to psychological distance between groups and clustering of items)[6]. Drawing on the concept of loss aversion, they argued that if there are both meaningful advantages and disadvantages of options within a group, disadvantages loom larger than advantages (Kahneman, Knetsch & Thaler, 1990; Kahneman & Tversky, 1984) and therefore the attractiveness of an option decreases the more it is compared with others. This line of reasoning suggests that grouping should hurt, and they present data to support this argument. In one study, items were systematically grouped, and people were asked whether they preferred a single item (for example, a Seafood restaurant) or their (unspecified) selection from three others (Mexican, Italian or Thai restaurant). The hypothesis was that an option is more likely to be chosen when alone than when part of a group. For each set of four items the sum of the preferences for each lone option should total 100%. In seven out of the nine groups

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[6] Sood, Rottenstreich and Brenner (2004) call the former a derived decision and the latter a direct decision.

the sum of the lone option choice share was greater than 100% (ranging from 105-125%, mean 116%). This suggests that each option was more attractive as a lone option than when it was part of a group. As this "comparisons hurt" argument is in direct conflict with the proposed lure of choice effect, this study will be examined in more detail in Chapter 5 where an experiment designed to replicate Brenner et al.'s findings is reported.

To turn to the consumer decision making literature, despite a predominant "more is better" ethos, some have argued that selections from a large group might be worse if too many items confuse the consumer. In the 1970s, Jacoby and colleagues claimed that consumers chose less well when offered too many brands (Jacoby, 1975, see also Russo, 1974). Accuracy of decision was measured by the correlation of each participant's preference ranking of options with the ranking predicted from an earlier questionnaire about what features mattered most to them. For brands of rice the decline in correlation occurred between 12 and 16 brands (Jacoby et al., 1974) whereas for shirts it was between 14 and 21 or between 21 and 28, depending on the subject pool (Moreno, 1974).

It has been argued that stockouts (i.e. reducing choice because stock is not available) is positive for consumers with large choice sets, as it makes the decision easier (Fitzsimons, 2000). Boatwright and Nunes (2001) found that with online grocery stores, when product lines received dramatic cuts in the number of the stock keeping units (SKU), sales were *increased* by an average of 11%. Although there was a reduction in purchase probability (some consumers stopped purchasing or purchased less), the increases in the amount bought by the majority far outweighed this loss of sales. Other major manufacturers have streamlined the number of options they provide to customers, apparently in response to a modest consumer rebellion against excessive choice. Proctor and Gamble, for example, reduced the number of

versions of its popular *Head and Shoulders* shampoo from a range of 26 varieties, to "only" 15, and then experienced a 10% increase in sales (Osnos, 1997). Similarly, the Aldi chain of shops (discount stores who offer a very restricted range of products) is very successful (Oppewal & Koelemeijer, 2005).

In order to cope with the decision complexity that accompanies increased choice (as discussed in Section 2.7), people may change the way they make decisions. For example, Bettman (1979) argued that consumers are likely to adopt simplifying strategies when the number of choice alternatives exceeds five (similar results were found by Olshavsky, 1979). Shugan (1980) suggested that people are motivated to avoid the effort associated with comparing and choosing from larger assortment arrays and adopt decision strategies that minimise *the cost of thinking*. Timmermans (1993) and Gigerenzer et al. (1999) argued that changing the heuristic used as the number of options increase is an adaptive response to an increasingly complex situation.

When the features of a choice set become more cumbersome to compare or require difficult trade-offs, decision makers may avoid making a decision (Luce, 1998; Tversky & Shafir, 1992a). In the real world, there is plenty of evidence that people delay or avoid difficult decisions. For example, executives try to postpone financial decisions longer the more difficult the decision becomes (Sawers, 2005). An alternative strategy that people may adopt in the face of difficult decisions is to choose an option that minimizes the need for further decisions. Dhar (1997) found that as the difficulty of decisions increases, participants were more likely to opt for a "no choice" option, adopt the default option, defer a decision, or search for new alternatives (see the discussion of the pursuit of useless information in Section 2.6.4, Shafir et al., 1993, Shafir & Tversky, 1992).

These observations from both experimentally manipulated and naturally occurring increases and decreases in the range of choice suggest that there are indeed some negative consequences associated with increased choice. The next sections examine two important developments in the study of this relationship.

2.9.2.i. Choice overload effect

Another potentially deleterious effect of increased choice is the demotivating effect it might have on behaviour in the future. In a widely-cited article, Iyengar and Lepper (2000; see also Iyengar, Jiang & Huberman, 2004) demonstrated that although people find larger choice sets more attractive than smaller ones in one sense, resultant purchase behaviour was less likely in the larger choice set. They found that when faced with either a limited choice (for example an array of six gourmet jams, chocolates or essay topics) or an extended array (of 24 or 30), people were attracted to the greater choice. For instance, in one study, members of the public were more likely to approach a stand where they could taste-test gourmet jams when there was a large range exhibited compared with a smaller array, in another they reported more enjoyment choosing from the larger number of chocolates than from a limited array. Ultimately, however, although shoppers were drawn to the large array of jams, they were less likely to return to it or buy something from it within a week period. Students were less likely to complete a voluntary essay from an extended list of topics than from a shorter list and those that did, produced work of a lower quality. Furthermore, participants reported finding selecting from an extended range of goods (30 different types of chocolate) more difficult than from a limited range (six types of chocolate). Iyengar and Lepper's interesting results suggest that while initially attractive, the excess of choice had negative consequences

in terms of intrinsic motivation and later satisfaction. They call this the *"choice overload"* effect.

To relate this effect to the lure of choice, it is possible to be drawn to a larger array and not be lured by choice. It is perhaps not surprising that more people are drawn to more options, since the more options there are, the more people's different tastes can be accommodated by those options. It would be surprising, however (and show the lure of choice), if more people chose blueberry jam when it was part of a large array than if it was displayed alone.

Furthermore, as discussed earlier in this chapter, Chernev (2003b) suggested that people may be put off by larger sets if they do not have an articulated preference set. Whilst most of us probably have relatively clearly articulated preference sets for the most common flavours of jam (e.g. raspberry, strawberry and blackcurrant), Iyengar and Lepper screened out the most popular jam flavours (to avoid ceiling effects). It is less likely that we would have readily articulated preferences between less common flavours that we may never have come across before such as gooseberry and rosehip jams. Hence, whilst being initially attracted to the large array, once participants' articulated preferences were challenged and found inadequate, choice became less attractive and they were demotivated to follow it up.

2.9.2.ii. The paradox of choice

The seeming contradiction that people prefer to choose among larger assortments, yet are often less confident about the decisions they have made has been noted elsewhere (see Chernev, 2006). The idea of the "tyranny of freedom" as described by Schwartz (2000) is gathering momentum, and refers to situations where freedom, autonomy, self-determination become excessive. Schwartz argued that that American society is unduly influenced by the ideology of economics and rational-

decision making theory, resulting in an excess of freedom. This leads to life dissatisfaction, and he even goes as far as to say that this can lead to clinical depression. This idea is elaborated in *"The paradox of choice"* (Schwartz, 2004), in which he described the paralysing feeling of facing too much choice in everyday decisions, regardless of how important these are. He suggested practical steps to reduce the number of choice to a "manageable" number (see Desmeules, 2002, for an application of this principle to marketing).

It may be that we are individually predisposed to feel this way. Schwartz et al. (2002) found that the desire to maximise (which is by definition related to the need to choose from a large as possible choice set) was positively correlated with depression, perfectionism and regret, whilst negatively correlated with happiness, optimism, self esteem and life happiness. In comparison with non-maximisers (satisficers, who accept the first option that meets their minimum requirements, and are hence likely to require a smaller choice set), maximisers are less satisfied with consumer decisions. This hypothesis was supported by Iyengar, Wells and Schwartz (2006) who found that college graduates who adopted a "maximiser" strategy in terms of finding a job did subjectively better (in terms of the salary of the job they ended up with) than their "satisficer" colleagues. However, they felt more negative about these outcomes, i.e. were less satisfied and felt more negative affect throughout the job search process. The authors argued that this is related to maximisers' tendency focus on realised and unrealised options during their job searches.

2.9.3. Cultural differences in the desire for choice

Discussion of the paradox of choice is based on a wholly Westernised, particularly Americanised, view of choice in society. Iyengar (1999) reviewed a body of work by Markus, Kitayama, Triandis and colleagues (Markus & Kitayama,

1991; Triandis, Bontempo, Villareal, Asai & Lucca, 1988, see also Iyengar & Lepper, 1999) which examined significant cultural differences between individualistic North America and Western Europe and the more collective Eastern culture in terms of the extent to which exercising personal discretion is valued (see also Schwartz, 2000). Iyengar's early work asked American and Japanese factory employees to catalogue the decisions they had made during a normal work day, and to rate how important each decision had been to them. American employees reported having made nearly 50% more decisions than their Asian counterparts. In addition, the Americans gave significantly higher ratings of importance of their decisions than did the Asians. Moreover, these employees were asked to list occasions on which they would wish not to have a choice. Unlike the Asians, most of the Americans said that they could not imagine a single circumstance in which they would prefer not to have a choice.

More recently, Rozin et al. (2006) conducted a large scale telephone interview programme with adults in France, Germany, Italy, Switzerland, the UK and USA, which asked about preference for choice in the food domain. One question asked whether respondents would prefer to go to an ice cream parlour that offered a range of 10 flavours, or one that offered a range of 50. The smaller choice set was preferred by a majority in all but the USA sample. Another question asked what respondents would expect the choice to be on the menu of an up-scale restaurant. A majority in each country expected a smaller choice, but this expectation was lowest for the UK and the USA sample. It appears that the USA and to some extent the UK, prioritise providing a range of choice that caters for individual preferences, whereas continental European countries are more concerned with communal eating values. Whether these expectations extend to other kinds of decisions is not clear, but there is obvious correspondence with the paradox of choice argument outlined above.

Along similar lines, Herrmann and Heitmann (2006) reviewed literature in the domains of cultural psychology and marketing that consider cultural differences in consumers' preference for variety. Overall, they concluded that consumers' perceptions of variety differ from the actual variety provided by the manufacturer or retailer. In line with the research on decision overload discussed above, they found that independent consumers in individualistic cultures place a premium on choice, on variety seeking and on personal freedom. While they are attracted by large variety, current cultural theory suggests that they also encounter greater cognitive and emotional costs than individuals in collective cultures when ultimately choosing.

2.9.4. Decision attitude and self determination

Decision attitude encompasses both reactions to increased choice addressed above – decision seeking and decision aversion (Beattie, Baron, Hershey & Spranca, 1994). Decision aversion is described as a preference for receiving an option through fiat, rather having to make a decision oneself. Decision seeking is when choice is more desirable, even though it can lead to nothing better than the best option. Decision attitude is considered to be a behavioural, context-specific concept, *not* a stable personality trait, and may be responsible for a number of behaviours that we observe in both individuals and societies. For example, decision attitude is likely to affect our responses to decision situations (decision aversion may make us unhappy and decision seeking make us happy in situations where we are expected to choose). Lastly, even if not totally avoided, decision aversion could lead us to decision inaction or omission and decision seeking could lead us to decide, even if not in our best interest (for example, ignoring the advice of experts).

Beattie et al. (2004) suggested that causes of decision avoidance are anticipated regret, fear of blame for poor outcomes and desire for equitable

distributions, whereas causes for decision seeking (for self and decision avoidance when making decisions for others) are identified as the desire for *self determination*.

Self determination is the subjective experience that emerges during fully autonomous (as opposed to controlled) intentions (Deci, 1975, 1981). Previous research has suggested that exposure to flexible interpersonal environments and opportunities to choose among options generally facilitate the perception of choice, and hence self-determination and intrinsic motivation (Cordova & Lepper, 1996; Iyengar & Lepper, 2002). For instance, allowing people to choose which tasks to work on has been shown to be related to an intention to continue (Thompson & Wankel, 1980), autonomous functioning (Langer & Rodin, 1976; Williams, Grow, Freedman, Ryan & Deci, 1996) and intrinsic motivation (Dwyer, 1995; Zuckerman et al., 1978). To the extent that people experience self-determination as a perception of choice, any social condition that encourages perceived choice should therefore increase both perceived self-determination and intrinsic motivation.

Interestingly, however, in an educational setting Reeve, Nix and Hamm (2003) found that simply offering option choices (which from a number of puzzles did the participants wish to complete) did not have any relationship to internal volition or intrinsic motivation. However, a different kind of choice, referred to as "action choice" *was* positively related to self-determination and intrinsic motivation. In other words, when participants were allowed not only to choose their puzzle, but to decide how long they worked on it, the task supported autonomy and increased motivation.

Similar results were found by Cordova and Lepper (1996). School children were provided with a series of ongoing action choices as they engaged in a computer game, including not only choices among options but also decisions about their work methods, pace and effort (see also Thomas & Oldfather, 1997). Presented in this

way, choice enhanced intrinsic motivation. This differentiation between action choice and option choice might help explain why the participants in Iyengar and Lepper's (2000) study were not motivated to act by increased choice (i.e. motivated to buy the jam). In Reeve et al.'s (2003) terminology, the choice offered at the tasting stand was a straightforward option choice rather than an explicit action choice. The action that was monitored by Iyengar & Lepper was the purchase of the product, and although the increased choice did result in increased motivation to stop at the stand, this was not the action of interest to the experimenters. It seems that that psychological distance between the choice offered and the behaviour measured was too great for any relationship to be observed in this instance. This potential link between extent of choice and self-determined action forms a part of the discussion of the lure of choice in later chapters.

2.10. Implications of the literature for this research

This chapter has examined in detail the different literatures relating to choice and preference thereof in the realms of animal and human judgment and decision making. From an economics perspective, the more choice a person is offered, the more likely it is that their preferences and needs can be met, and therefore increased choice should be considered a benefit. On the other hand, the literature on behavioural decision theory, consumer decision making and animal decision making is mixed in its evaluation of the advantages and disadvantages associated with increased choice. Although some consistent themes emerge (such as people experience difficulty making tradeoffs as the complexity of a decision increases, and that many decisions involve sequential processes) the impression one is left with after reviewing the literature is that there is still ambiguity surrounding preference for, and reactions to, increased choice. The literature lacks a systematic investigation

that examines a person's behaviour in the context of increased choice in a number of contexts. This ambiguity and divergence of opinions provides both the inspiration and justification for this thesis.

Building on the research evidence amassed so far, the next three chapters describe ten new empirical studies that investigate the impact of increased choice on people's behaviour.

Chapter 3. The early studies: Demonstrations of a consistent lure of choice

"He who chooses the beginning of a road chooses the place it leads to. It is the means that determine the end." Harry Emerson Fosdick, (1878-1969).

3.1. Introduction

The previous chapter summarised and evaluated the current state of psychological, animal and consumer literature in terms of behavioural preference for, or avoidance of, choice. It was seen that there is contrary evidence – under some circumstances, too much choice is unappealing, and indeed can be considered detrimental or even harmful, yet in other situations it appears to be desired and can be beneficial. In addition, Chapter 1 offered some real life examples to illustrate how increased choice can attract people towards a certain course of action, that without choice they might otherwise not have taken. As such, these decisions can violate the principle of irrelevant alternatives and regularity condition (as discussed in Section 2.2.1). This potential effect was introduced as the lure of choice (Bown et al., 2003, see Section 1.3).

The initial set of studies reported in this chapter (Studies 1 to 4) address research question i and ii: "Does the presence of choice lead people to act in a way they would not otherwise have done?" and "Are people attracted to options that allow them the opportunity to choose from a number of options?" To put it another way, is there is a lure of choice, and if so, does offering people choice in the future produce violations of regularity. As discussed in Chapter 1, these early exploratory studies were "phenomena-led," in that they were developed to reflect real life observations of the kind described earlier (such as going to a particular shopping centre where a large range of options is available, despite the fact that not all of them

might be viable alternatives for the individual concerned). This is especially true of Study 1, in which a believable, real-life scenario was described in terms of a two-stage decision problem. The format and design of Study 1 was created in order to investigate whether, like in the anecdotal examples, a potential choice of options at a later stage in proceedings can affect decision behaviour early on in scenarios with outcomes that are quantifiable and measurable. Studies 2 to 4 built on the observations of scenario-based Study 1, using more controlled materials, in order to test the robustness and parameters of the lure of choice and start to explore the possible theoretical underpinnings of it.

3.2. Overview and methodology of Studies 1-4

The general experimental approach used for the first series of four studies used between-participant designs with volunteer student participants. Participants took part in one study only. The activities were paper and pencil tasks: some comprised realistic decision scenarios whereas others used abstract gambles.

In these studies, participants chose between a sure thing and a lottery. The lottery either led to a single lottery (no-choice condition) or to a choice between lotteries (choice) condition. The choice was illusory, however, because the lottery common to both conditions (called the *target*) either dominated, or was otherwise superior to its alternative (the *lure*), and therefore under no circumstances would it be rational to select the lure. Participants in Studies 1 to 4 were presented with choice tasks that had the general structure of the decision tree in Figure 5.
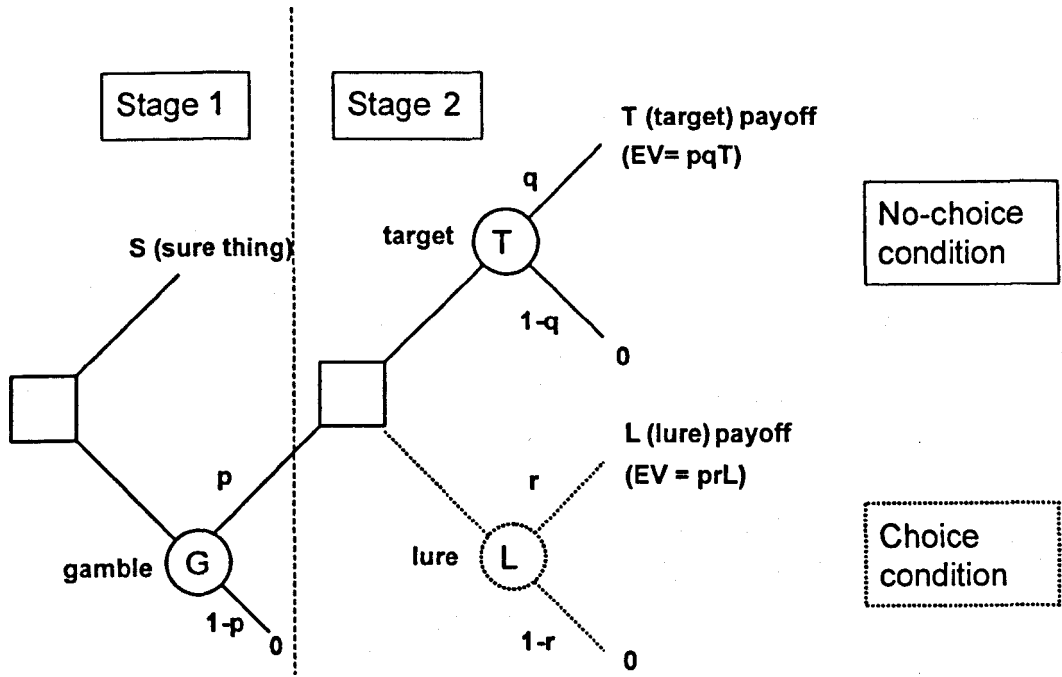
Figure 5. General decision structure for Studies 1-4. Square boxes in the decision tree correspond to choice nodes, and the circles correspond to chance nodes. S = sure thing, T = target lottery, L = lure lottery and G = gamble (accept lottery). All probabilities (p, q, r) and payoffs were fully specified to participants.

There were two stages to the decisions in these studies. In Stage 1, participants chose between a *sure thing* (S) and a *lottery/gamble* (G). The lottery offered a chance (p) of getting through to Stage 2, or a chance (1-p) of finishing the game with nothing. At Stage 2, participants in the *no-choice* condition received the target lottery only (T), while participants in the *choice* condition were required to choose between the target lottery and an inferior lure (L). All choices and associated payoffs and probabilities were fully specified, and participants were encouraged to read the choice alternatives carefully before making any decision.

The payoffs and probabilities used in all conditions of Studies 1 to 4 are summarised in Table 1. The rationale for each of these conditions is explained more fully in the sections below that describe each study.

Study & lure condition(s)	Scenario type	Sure thing	p(G)	Q(T)	V (T)	EV(T)	r (L)	V(L)	EV(L)
1 (dominated)	Realistic	£20k	.2	.75	£150k	£22.5k	.75	£50k	7.5k
2 (dominated)	Lottery	£20	.2	.75	£150	22.5	.75	£50	7.5
2 (conflicted)	Lottery	£20	.2	.75	£150	22.5	.9	£50	9
3 (dominated)	Lottery	£30	.2	.75	£150	22.5	.7	£120	16.8
3 (conflicted)	Lottery	£30	.2	.75	£150	22.5	.9	£100	18
4 (high contrast)	Lottery	£30	.2	.75	£150	22.5	.75	£50	7.5
4 (low contrast)	Lottery	£30	.2	.75	£150	22.5	.75	£140	21
4 (three-choice)	Lottery	£30	.2	.75	£150	22.5	.75 / .75	£50 / £140	7.5 / 21

Table 1. Decision parameters for all conditions of Studies 1- 4. G = gamble to get through to Stage 2, T = target lottery, L = lure lottery, V = payoff (value) and EV = expected value, p, q and r = probabilities.

The normative decision procedure for participants in a choice condition of this kind is straightforward and intuitively obvious. They should begin at Stage 2 and decide which of the two alternatives they would choose if they got to that point (usually the target lottery). If they prefer the target lottery, they should then choose between the sure thing and the lottery of receiving the target payoff with probability *pq*. If they prefer the lure, they should choose between the sure thing and the lure with probability *pr*. This procedure, called *backward induction* or rollback (Goodwin & Wright, 1998), involves pruning away or ignoring all never-to-be-chosen branches in the decision tree. The major question in this set of studies is whether participants do this pruning. That is, do those who prefer the target to the lure (expected to be the majority) recognise that the real choice is between the target and the sure thing (because the choice between the target and the lure is illusory).

The major dependent measures were (a) the proportion of participants continuing at Stage 1 rather than taking the sure thing and (b) the proportion of those continuing who choose the target at Stage 2. Statistical analysis is made more complicated by the possibility that people will occasionally choose the lure, and the

consequent necessity to decide what they would have chosen if the lure was not available. There are three possible statistical tests that differ in their assumptions concerning this counterfactual choice. The *conservative* test compares the proportion choosing the target in the no-choice and choice conditions (i.e. the lure and sure thing choices are combined together). This test assumes that those who chose the lure would have chosen the sure thing if the lure had not been available (i.e. their preference order was lure ≻ sure thing ≻ target), thus it is biased against demonstrations of the lure of choice. Another *liberal* test compares the proportions choosing the lottery in the two conditions and assumes that those who chose the lure would have chosen the target if the lure had not been available (their preference being lure ≻ target ≻ sure thing). The liberal test is biased in favour of supporting the lure of choice. In these studies, an intermediate *third way* analysis was adopted, which includes only those who chose either the sure thing or the target. This test assumes that the population contains a roughly even mix of people with the two preference orders described above, and so is unlikely to bias the analysis in either direction.

3.3. Study 1

This exploratory study was designed to simply test whether the presence of choice at a later stage was sufficient to lead people to make early decisions that they would not have done had no later choice had been present. In this case, the choice at Stage 2 was illusory, in that the additional lure choice was dominated by the target choice.

Formally speaking, if the presence of illusory choice has no effect on behaviour, and assuming that people will not select the obviously sub-optimal lure option, the null hypothesis for this study:

H_{o1} (null hypothesis): the proportion of participants selecting the sure thing in the no choice condition will be equivalent to the proportion selecting the sure thing in the choice condition.

However, if, the presence of choice *does* affect people's decision behaviour, then:

H_{1i} (effect of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be different to the proportion selecting the sure thing in the dominated-choice and conflicted-choice conditions.

H_{1i} represents a weak prediction, in that the direction of any difference is not specified. If the lure of choice operates in the way suggested in Chapter 1, a stronger prediction is:

H_{1ii} (lure of choice hypothesis): the proportion of participants selecting the sure thing in the no- choice condition will be greater than the proportion selecting the sure thing in the choice condition.

In this study respondents were presented with a brief, realistic case scenario in a context with which they were familiar. During a class session, 127 undergraduate management students (comprising 52% females, mean age 18.4 years) were presented with a business case in which they were asked to imagine they owned a small catering company that provided hospitality facilities for events such as

outdoor pop music festivals (see Appendix A for further details). The business case explained that in recent years the company had worked at a local festival that earned them a relatively modest, but guaranteed payment of £20,000 (the *sure thing*), but that in the coming season the company could forego this in favour of an attempt to win a contract to work at one of two V2000 concerts (part of a well-known series of UK music festivals). One of these venues, the target, had the potential to be far more lucrative for them (but was not guaranteed) and the other was less likely (the lure). The case explained that the selection of V2000 contractors was a two-stage process. In Stage 1 likely contractors who offered a tender were short listed. If the company chose to tender, there was only a 20% chance it would be short listed. The company would then be able to choose which V2000 concert the company wished to operate at Stage 2 (either the target venue or the lure venue). The timing of the events meant that company had to choose *either* the sure-thing option or the riskier tender option at Stage 1. Due to timing constraints, if the company tendered for V2000 and failed to get through Stage 1, it would be too late to revert to the sure thing and their earnings would be zero [7].

Participants were randomly allocated to experimental conditions, and received one of two versions of the case (see Figure 6). In the *no-choice* condition, Stage 2 of the V2000 tender process consisted of only the *target* bid (Venue T: 75% chance of earning £150,000 and 25% chance of nothing). These participants were asked what they would do at Stage 1. In the *choice* condition, they were able to choose to bid for one of the two events at Stage 2, either the target (Venue T) or a *lure* (Venue L: 75% chance of £50,000). As the target dominated the lure (a higher

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[7] In the materials, the regular annual arrangement (sure thing) festival was the fictitious Kirkbridge festival, and the two potential V2000 venues that represented the high payoff target (T) and the lower payoff lure (L) were Temple Newsam, Leeds and Chelmsford, respectively.

potential payoff associated with the same risk), it was expected that no one would opt for the lure, and so, essentially, the choice at Stage 2 was illusory. Participants were asked to read through all the details of the options at both stages, and were then asked to indicate their choice of behaviour at Stage 1. It was made clear that only choices at Stage 1 were required, as it was important that participants did not *assume* that they would have the choice between the lure and the target, as this was technically only available to one in five (20% chance of going through to Stage 2).
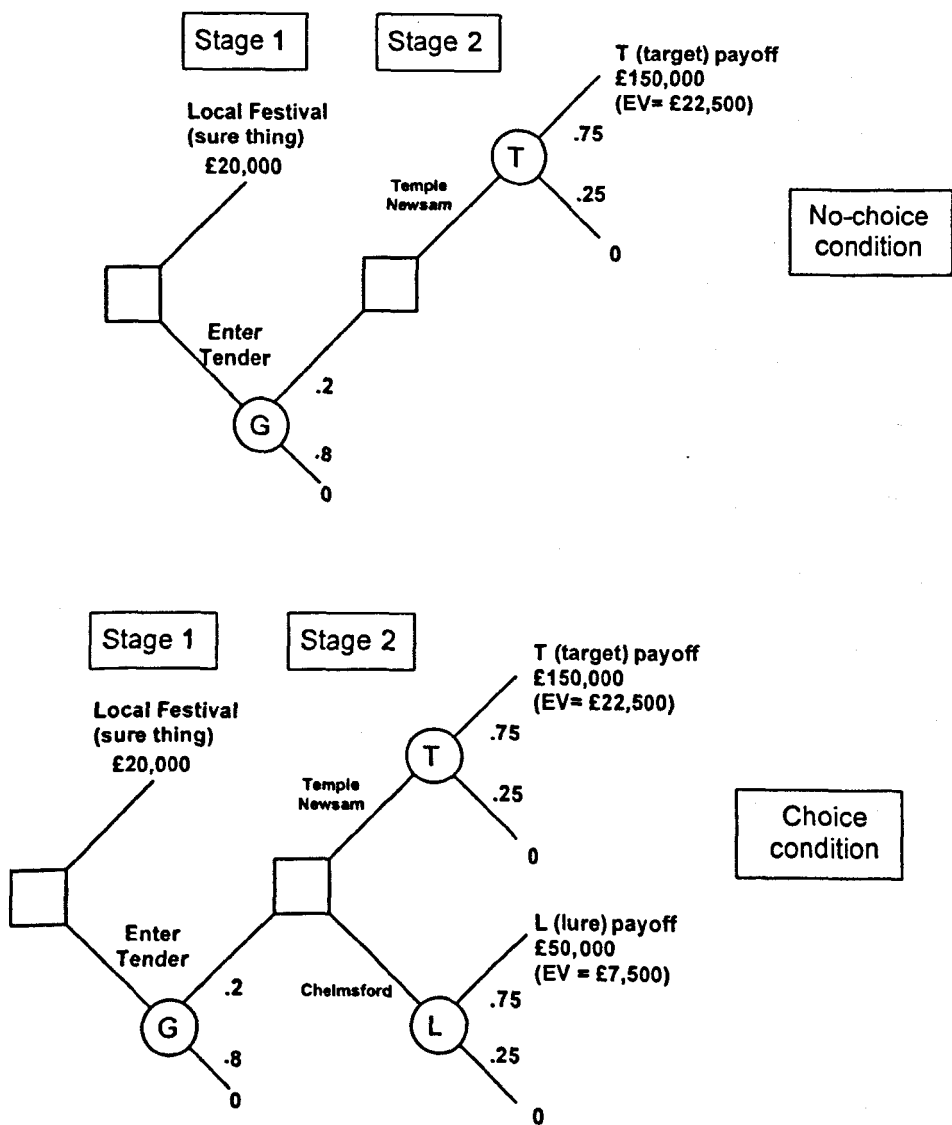
Figure 6. Decision structure of Study 1. Square boxes in the decision tree correspond to choice nodes, and the circles correspond to chance nodes. S = sure thing, T = target lottery, L = lure lottery and G = gamble (accept lottery). All probabilities (p, q, r) and payoffs were fully specified to participants.

Once they had indicated their choice at Stage 1, they were instructed to turn the page in the materials booklet and had they had opted to tender (gamble), they were told to imagine that they had got through to the second stage of the tender process[8]. They were then asked which option they preferred at Stage 2 (either the target or the lure).

3.3.1. Results and discussion of Study 1

The results of this study, reported in Table 2, show that more participants chose the risky V2000 tender option in the choice condition (62%, including those who chose either the target or the lure options, which drops to 57% when those choosing the lure option are excluded) than in the no-choice condition (39%) (χ^2 (1) = 5.43, $p < .05$, Cramer's V = .21, *third-way analysis*). The inclusion of the dominated option at Stage 2 lured people into a riskier course of action at Stage 1 than they would have otherwise taken. This also led to a violation of the regularity condition. As explained in Chapter 2, the regularity condition of choice states that the market share of an option cannot be made larger by adding options to the choice set (Shafir et al., 1993; Tversky & Simonson, 1993). In this case, fully 18% (57% versus 39%) more participants chose the target in the choice condition, even though they had more options to choose from (three as opposed to two).

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[8] All participants opting to gamble at Stage 1 were told after they had made their decision to assume they had got through to Stage 2 as it was important to assess what proportion chose the target and the lure.

		Decision at Stage 1	
	Sure thing	Lottery	
		Decision at Stage 2	
Condition		Target	Lure
No-choice (N = 64)	61	39	-
Choice (N = 63)	38	57	5
Excluding lure choices (N = 60)	40	60	-

Table 2. Results of Study 1, V2000 business scenario. Numbers represent percentage choosing each alternative.

This is a compelling result. There is clear evidence that simply including an additional (illusory) choice at Stage 2 led to a near-perfect preference reversal between the sure thing and the (riskier) target option, whereby the sure thing was preferred over the gamble in the no-choice condition and *vice versa* for the choice condition. This is evidence in support of hypothesis H_{1i} *(effect of choice hypothesis)*, and is in the direction of the strong prediction of H_{1ii} *(lure of choice hypothesis)*. The null hypothesis can be rejected. In terms of effect size, this is considered to be a small to moderate effect (De Vaus, 2002).

However, this first demonstration of the lure of choice should perhaps be treated with caution. Realistic scenarios such as those used in Study 1 have high face validity and are motivating, yet they can become increasingly implausible when they are forced to fit theoretically interesting problems. Furthermore, the very fact that the materials are realistic could have somehow led participants to be unduly influenced by extraneous characteristics of the context. For example, it may have been features of the lure that attracted people in this direction at Stage 1, such as Chelmsford holding great appeal for the student participants in this study because of its geographic location (not recognised by the experimenter), rather than the allure of choice. The fact that Chelmsford was a financially unattractive option in comparison

to Temple Newsam must have been realised at Stage 2, as very few participants selected this lure option.

This possibility is highly speculative, but demonstrates one of the main problems to be overcome when interpreting findings based on choices that resemble real life situations and which vary on any number of criteria outside of the control of the experimenter. To counter such possible confounding variables, the next three studies in this series stripped out potentially influential surface characteristics to test the influence of choice *per se*, with the features of the choices on offer experimentally manipulated on pre-determined dimensions. In the remaining studies in the exploratory series (Experiments 2 to 4) participants' responses to classic hypothetical lottery problems for financial payoffs were tested.

3.4. Study 2

The rationale for Studies 2 and 3 was to replicate Study 1, with specific variations to investigate further aspects of the lure of choice, in particular whether the nature of the relationship between the lure and the target has an impact on the preference reversal observed in Study 1. There were three conditions in Study 2 (see Figure 7 for the structure of Study 2 and Appendix B for the materials).

The first two conditions were structurally the same as those in Study 1, except that the amounts of money involved were smaller (by a factor of one thousand). The third condition was an additional choice condition in which there was conflict between the target lottery and the lure: the probability of winning the lure lottery was higher, but the payoff was smaller than the target. Although it appeared from Study 1 that the lure of choice occurred when the target dominated the lure, this option was included to establish if the presence of choice conflict would increase or decrease the effect.

Figure 7. Decision structure of Study 2. Square boxes in the decision tree correspond to choice nodes, and the circles correspond to chance nodes. S = sure thing, T = target lottery, L = lure lottery and G = gamble (accept lottery). All probabilities (p, q, r) and payoffs were fully specified to participants.

As in Study 1, the *no-choice* condition offered participants the choice between a sure thing and a lottery to go through to Stage 2. At Stage 2, these

participants were faced with the target option. In the *dominated-choice* condition the lure was dominated by the target (same probability, lower payoff). In the *conflicted-choice* condition the lure option was in conflict with the target option (higher probability but lower payoff), although it was still considerably worse in terms of expected value (.2 x .9 x 50 = 9 for the lure, compared to .2 x .75 x 150 = 22.5 for the target). As suggested by the results of Study 1, if the presence of choice *does* affect people's decision behaviour in a systematic way, it was predicted that both choice conditions would draw participants into taking the lottery at Stage 1:

> *H_{2i} (lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting sure thing in the dominated-choice and conflicted-choice conditions.*

It might also be reasonable to hypothesise that the absolute transparency with which the target dominated the lure in Study 1 would moderate the lure of choice effect, and a choice option that is less obviously illusory (i.e. conflicted) would increase the likelihood of observing the lure of choice effect. Hence:

> *H_{2ii} (conflicted lure of choice hypothesis): the proportion of participants selecting the sure thing in the dominated-choice condition will be greater than the proportion selecting the sure thing in the conflicted-choice condition.*

One hundred and forty-four undergraduate management students (not involved with Study 1), comprising 59 females (41%) and 85 males (59%) with mean age 18.59 years, took part in this study during class time. Each was randomly allocated to one of the three experimental conditions.

3.4.1. Results and discussion of Study 2

As a replication of Study 1 without the possible distracting features of a real world scenario, the results of Study 2 were as convincing as those of Study 1. As can be seen in Table 3, the proportion opting for the (safe) sure thing in the no-choice condition of Study 2 was 64% (compared with 61% in Study 1). Likewise, the proportion opting to gamble at Stage 1 in the replicated dominated-choice condition was remarkably close to the corresponding condition in Study 1 (37% compared with 38% in Study 1). When there was the possibility of a choice at Stage 2, in both the dominated-choice and the conflicted-choice conditions, there was an increase in the number of participants taking the lottery. An overall chi-square analysis revealed a significant difference across all three conditions ($\chi^2(4) = 17.60$, $p < .01$, Cramer's V $= .24$).

		Decision at Stage 1	
		Lottery	
	Sure thing	Decision at Stage 2	
Condition		Target	Lure
No-choice (N = 47)	64	36	-
Choice:			
Dominated-choice (N = 51)	37	63	0
Conflicted-choice (N = 53)	38	53	9
Excluding lure choices (48)	42	58	-

Table 3. Results of Study 2. Numbers represent percentage choosing each alternative.

Separate analyses comparing choice and no-choice conditions revealed a significant effect for the dominated-choice condition ($\chi^2(1) = 6.91$, $p < .01$, Cramer's V $= .27$). Like Study 1, the preference reversal demonstrated in the dominated-choice condition was almost symmetrical – in the no-choice condition 64% selected the sure-thing option, and in the dominated-choice condition, 63% chose to gamble at Stage 2. When faced with the choice between the lure and the target at Stage 2 in

this condition, all chose the target. Separate analysis for the no-choice and conflicted-choice conditions also showed a significant difference (χ^2 (1) = 4.68, $p <$ .05, Cramer's V = .22, *third way analysis)*. Taken together, these finding provides support for H_{2i}, the basic lure of choice prediction, with a small to moderate effect (de Vaus, 2002).

The difference in effect sizes between the dominated and conflicted choice conditions (Cramer's V = .27 and .22, respectively) occurred because while the same proportion opted for choice in the two choice conditions (63% and 62%), a few people (9%) in the conflicted-choice condition chose the lure over the target. The difference between the two choice conditions, however, was not significant (χ^2 (2) = 5.26, n.s.). Hence, H_{2ii} *(conflicted lure of choice hypothesis)*, which suggested that a conflicted-choice might be more alluring than a dominated choice, was not supported. Possible reasons for this are identified in the general discussion of this chapter (Section 3.7) and tested explicitly in Studies 3, 6 and 7.

Overall, Study 2 (like Study 1), revealed a strong violation of the regularity condition, the effect being slightly stronger in the dominated-choice condition. In other words, the proportion of people choosing the target was higher in conditions that led them there by way of a choice-route than in the condition which offered them no choice. Study 3 explores the parameters of this lure of choice effect more extensively.

3.5. Study 3

The rationale for Study 3 was to test the limits of the lure of choice effect by determining whether it would operate even when the sure thing was manifestly better than the target. This study addresses research question iii: "If people are attracted to choice, is the effect strong enough to lead them to make sub-optimal decisions?"

Would participants forgo a "better" option, in order to follow a course of action that offered them the chance to make their own decision between two further options? This was achieved by increasing the value of the sure thing so that it had a higher expected value than the target. It is known that most people tend to be *risk-averse* in the domain of gains, and that a sure thing is generally preferred to a lottery with the same expected value (Kahneman & Tversky, 1979). Study 3, in addition to attempting to replicate the general results of the earlier studies, was designed to determine if the lure of choice would be strong enough to overcome this normal disinclination to gamble. As can be seen in Figure 8, the sure thing in this study was £30 and the target alternative had an expected value of £22.50 (.2 x .75 x 150), as in Study 2. In the dominated-choice condition the lure was inferior to the target on both the probability and payoff dimensions, i.e. it was strongly dominated. The dominance of the target should therefore have been even more transparent than it was in the dominated-choice condition of Study 2, making the required tradeoffs easier for participants. The probability associated with the choice option in the conflicted-choice condition was the same as those used in the corresponding condition of Study 2, although the payoff was increased slightly to be more in line with that of the dominated-choice condition. The expected value of the lure in this condition was still less than the target option (.2 x .9 x 100 = £18 compared to 22.5).
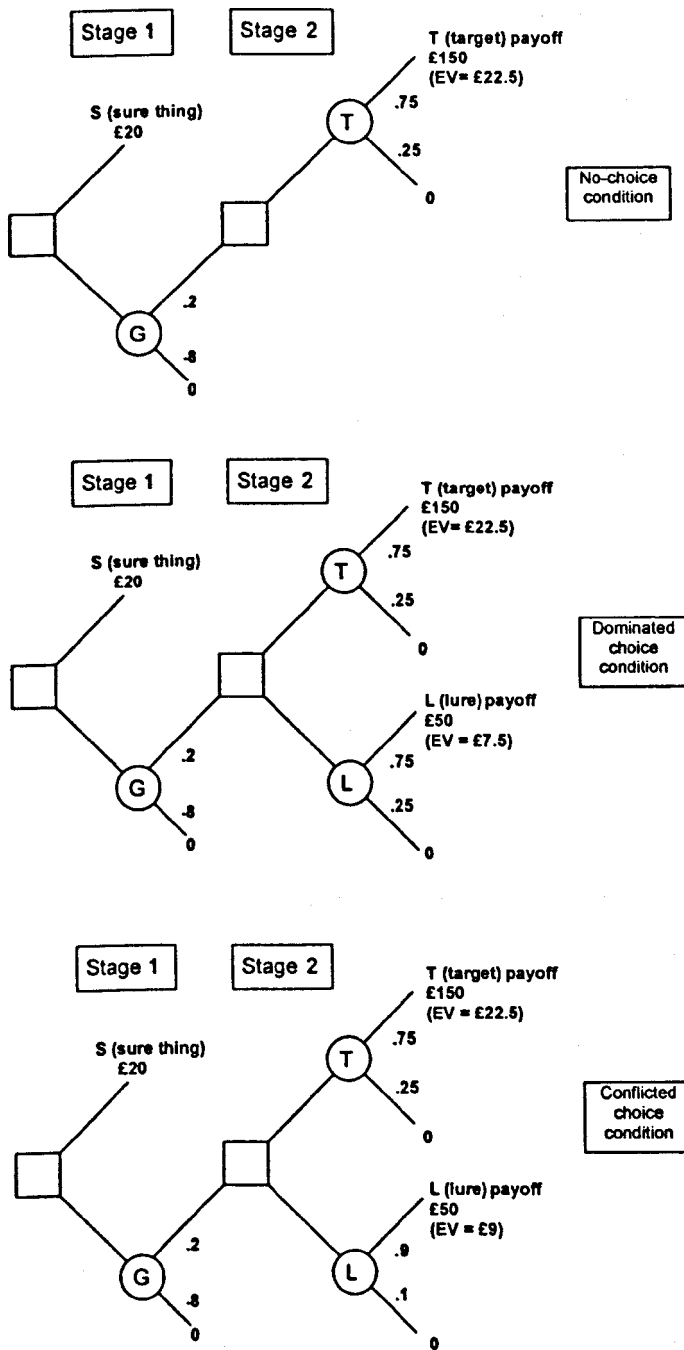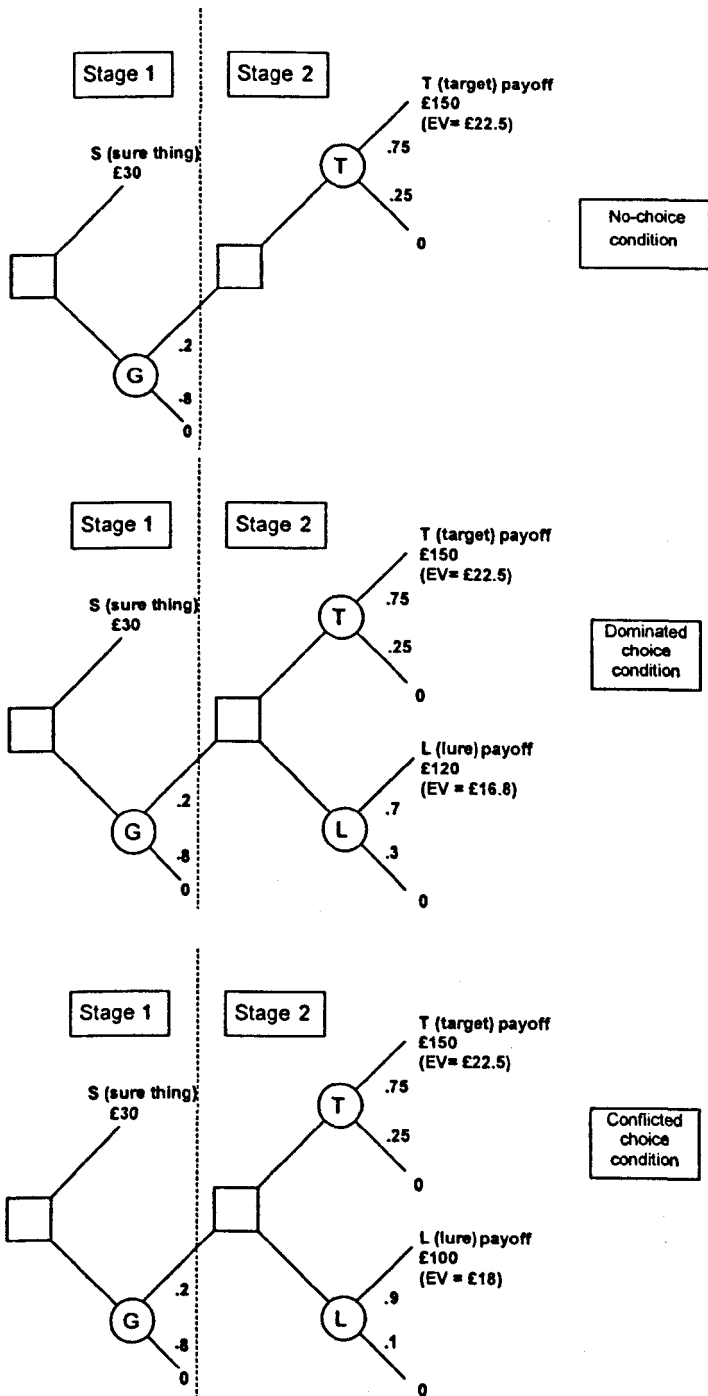
Figure 8. Decision structure of Study 3. Square boxes in the decision tree correspond to choice nodes, and the circles correspond to chance nodes. S = sure thing, T = target lottery, L = lure lottery and G = gamble (accept lottery). All probabilities (p, q, r) and payoffs were fully specified to participants.

On the basis of the robust findings of Studies 1 and 2, the predicted relationship between choice offered and decision behaviour in the dominated-choice condition was as follows:

H3i: (dominated lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting the sure thing in the dominated-choice condition.

Likewise, the findings for the conflicted-choice condition of Study 2 suggest a similar pattern for the conflicted-choice condition:

H3ii (conflicted lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting sure thing in the conflicted-choice condition.

One hundred and fifty participants were recruited from seating areas around a university campus and were randomly allocated to one of the three experimental conditions (see Appendix C for details of the materials). 47% of the sample was female, sample mean age was 20.4 years.

3.5.1. Results and discussion of Study 3

Reflecting the greater value of the sure thing in this study, almost 10% more participants (nearly three quarters) in the no-choice condition in Study 3 opted for the sure thing than in either of the earlier lottery studies (see Table 4). An overall chi-square analysis revealed a significant difference between conditions ($\chi^2(4) = 35.59$, $p < .001$, Cramer's V = .49). Increasing the value of the sure thing did not, however, attenuate the lure of choice effect, and another clear preference reversal was demonstrated in the choice conditions. Far more participants ended up with the target in both choice conditions than in the no-choice condition, offering support for both *H3i (dominated lure of choice hypothesis)* and *H3ii (conflicted lure of choice hypothesis)*. Separate analyses showed that the difference between choice and no-

choice was significant for the dominated-choice condition (χ^2 (1) = 13.06, $p < .001$, Cramer's V = .37, *third way analysis*) and conflicted-choice condition (χ^2 (1) = 8.72, $p < .01$, Cramer's V = .32, *third way analysis*)[9]. Both these effects are moderate to substantial (de Vaus, 2002).

	Decision at Stage 1		
		Lottery	
	Sure thing	Decision at Stage 2	
Condition		Target	Lure
No-choice (N = 46)	72	28	-
Choice:			
Dominated-choice (N = 51)	33	63	4
Excluding lure choices (N = 49)	35	65	-
Conflicted-choice (N = 53)	30	45	25
Excluding lure choices (N = 40)	40	60	-

Table 4. Results of Study 3. Numbers represent percentage choosing each alternative.

Despite the increased value of the sure thing, these effects were even stronger than their corresponding conditions in the earlier studies. According to de Vaus (2002), the effects sizes (.21 to .27) in the earlier study could be considered small to moderate, and these are considered moderate to substantial (.32 to .37). This can be explained by the fact that the increased sure thing in this study was enough to ensure people demonstrated the expected risk aversion in the no-choice condition, but seemed to do little to dissuade people from gambling in the choice conditions. Indeed, coupled with the increased EVs of the lures in the dominated-choice and conflicted-choice conditions of this study (16.8 and 18, respectively) compared with the lower EVs of the corresponding conditions of the earlier studies (7.5 and 9 in Study 2) it is perhaps unsurprising that the effect appears stronger here, and indicates that the lure option, although ultimately chosen by relatively few participants, has a

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[9] The difference between the basic choice conditions was significant (χ^2 (2) = 9.21, $p < .01$, Cramer's V = .29) but when *third way analysis* was applied, the difference

very real influence on the choice behaviour of people. Related to this fact, as in Study 2, a number of participants (25%) selected the suboptimal lure in the conflict-choice condition, a finding that is returned to in Section 3.7.

Study 3 demonstrates the robustness of the lure of choice effect. Even when the sure thing was preferred by the great majority of participants in a direct choice between it and the target (and by most accounts would be considered objectively superior), this reversed dramatically when the target lottery was made available as one of a choice. Indeed, the proportion choosing the lottery was much the same in Study 3 as it was in the earlier studies (58%- 64%), when the sure thing (but not the target) had a much lower expected value.

As discussed above, an additional difference between Study 3 and the earlier studies is that while the target was the same in Studies 1 and 3, the lures in Study 3 had higher expected values than those in Studies 1 and 2. This higher value may, in turn, have acted as counterweight to the increased value of the sure thing in this study. Study 4 was designed to investigate how the lure of choice is affected by the value and number of lures. In order to ensure a full range of option values were replicated, the sure thing and target of Study 3 were used along with the same lure as in Studies 1 and 2.

3.6. Study 4

The rationale for Study 4 was to go beyond simple demonstrations of the lure of choice effect demonstrated in Studies 1-3 in order to test possible reasons for it. Specifically, it was designed to test two possible explanations for why the addition of an illusory choice increases the proportion of participants choosing the target option. Firstly, the lure of choice may be due to a *contrast effect* (e.g., Simonson & Tversky, 1992; Tversky & Griffin, 1991), as discussed in Chapter 2 (Section 2.6.5.). Given

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was non-significant ($\chi^2 (1) = .27$, n.s., Cramer's V $= .06$).

that people were required to compare the target and lure options at Stage 2, the fact that the target was clearly superior to the lure could make it more attractive than when it was presented alone. If this is true, then the proportion taking the choice option should increase as the superiority of the target over the lure increases. In Study 4 two conditions were compared in which the size of the contrast between the target and the lure was varied, and where a contrast effect would predict a corresponding variation in the magnitude of the lure of choice effect.

A second possible explanation is that instead of comparing the attractiveness of the target and lure options *independently* (which is the normatively rational thing to do), the lure of choice effect may be due to the inappropriate *summing* of the available options at Stage 2. In other words, participants in the choice condition may have been acting as if they could have *both* the options available at Stage 2 (be it through participants either misunderstanding the nature of the task, or failing to utilise backward induction properly, and being subconsciously influenced by the array on offer). In Study 4 this was tested by comparing the strength of the lure of choice when the total value of the target and lure were varied. A summing effect would predict that the greater this total value, the stronger the lure of choice effect.

Study 4 had four conditions (see Figure 9 and Appendix D for materials). The *no-choice* condition was identical to that of Study 3. The *high-contrast choice* condition offered two options at Stage 2: the target and a dominated lure that was much worse than the target on the payoff dimension (£50 versus £150) but had the same probability of reward (.75). The lure in the *low-contrast choice* condition was also dominated, but was only slightly worse than the target on the payoff dimension (£140 versus £150), whilst maintaining the same probability (.75). The *three-choice* condition included both the high and low-contrast lures as well as the target as options at Stage 2.
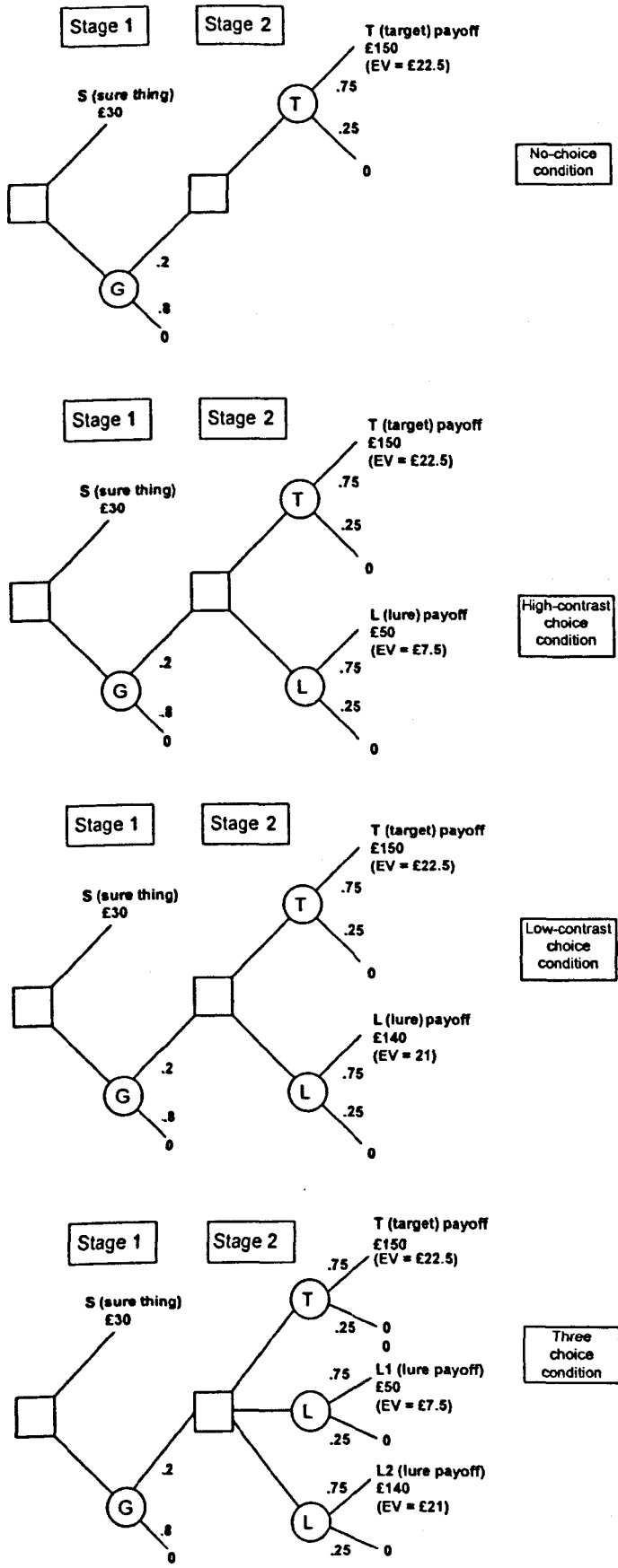
Figure 9. Decision structure of Study 4.

The basic lure of choice prediction can be made for each choice condition:

H_{4i} *(high-contrast lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting the sure thing in the high contrast-choice condition.*

H_{4ii} *(low-contrast lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting the sure thing in the low contrast-choice condition.*

H_{4iii} *(three-choice lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting the sure thing in the three-choice condition.*

In addition, if the lure of choice is influenced by a contrast effect, then its magnitude should increase as the contrast between the target and lure increases. One would expect, therefore, a greater lure of choice effect in the high-contrast than in the low-contrast choice condition.

H_{4iv} *(contrast-determined lure of choice hypothesis): the proportion of participants selecting the sure thing will be less in the high-contrast condition than in the low-contrast condition.*

This explanation would make no specific prediction regarding the three-choice condition. However, if the second possible explanation is true and summing effects contribute to the lure of choice, then the magnitude of the effect should increase as the total value of the target plus lure(s) increases. Hence it would be expected that the greatest lure of choice occurs in the three-choice condition, the next greatest in

the low-contrast condition, and the least in the high-contrast condition. Put formally, this explanation would predict:

Option summing-determined lure of choice hypotheses:

H_{4v}: *the proportion of participants selecting the sure thing will be less in the three-choice condition than the in the low-contrast condition,* and

H_{4vi}: *the proportion of participants selecting the sure thing will be less in the low-contrast choice condition than the in the high-contrast condition.*

This hypothesis is in direct competition to H_{4iv}, *the contrast-determined lure of choice hypothesis.* A supplementary hypothesis can be generated on the basis of the number of options available within the choice set. On the basis of previous work (particularly from an economic perspective) it is possible to speculate that in these conditions that if people favour choice over no choice, they will favour greater choice over less choice. Hence:

H_{4vii} *(number of options-generated lure of choice hypothesis): the proportion of participants selecting the sure thing in the three-choice condition will be less that in either of the two choice conditions.*

Two hundred and forty undergraduate students, not involved with previous studies, comprising 114 females (48%) and 127 males (53%), mean age 18.9 years, voluntarily took part in this study during class time and were randomly allocated to one of the four experimental conditions.

3.6.1. Results and discussion of Study 4

The pattern of results was a familiar one. As can be seen in Table 5, most individuals in the no-choice condition favoured the sure thing at Stage 1 (55%). This is somewhat lower than the comparable no-choice condition in Study 3. Once again, there was a shift to a majority preference for the lottery in all the choice conditions, indicating a lure of choice preference reversal effect. An overall chi-square showed that there were significant differences between conditions (χ^2 (6) = 10.69, $p < .05$, Cramer's V = .21).

		Decision at Stage 1	
		Lottery	
	Sure thing	Decision at Stage 2	
Condition		Target	Lure
No-choice (N = 60)	55	45	-
Choice:			
High-contrast choice (N = 60)	35	65	0
Low-contrast choice (N = 60)	32	67	2
Excluding lure choices (N = 59)	32	68	-
Three choices (N = 60)	40	60	0

Table 5. Results of Study 4. Numbers represent percentage choosing each alternative.

Separate analyses between no-choice and the different choice conditions revealed some significant differences: for high-contrast condition, χ^2 (1) = 4.85, $p < .05$, Cramer's V = .20; for low-contrast condition, χ^2 (1) = 6.28, $p < .05$, Cramer's V = .23, *third way analysis*; and for the three-choice condition, χ^2 (1) = 2.71, $p = .1$, n.s. The significant results were low to moderate effects (de Vaus, 2002). In terms of the basic lure of choice hypotheses, these results support H_{4i} *(high-contrast lure of choice hypothesis)* and H_{4ii} *(low-contrast lure of choice hypothesis)*, but not H_{4iii} *(three-choice lure of choice hypothesis)*. It appears that the choice of three options at Stage 2 was not as attractive as a choice of two options (that is, there is no support for H_{4vii} *(number of options-generated lure of choice hypothesis)*. This finding is not

incongruent with previous research that shows that too much choice can be unattractive (Bettman, 1979; Chernev, 2003a, 2006; Iyengar, et al., 2004; Iyengar & Lepper, 2000) and will be discussed further in Section 3.7 and Chapters 5 and 6.

To turn to test the two competing possible explanations of the lure of choice, comparisons between the choice conditions amongst themselves showed no support for either the contrast or the summing hypotheses (H_{4iv} contrast-determined lure of choice hypothesis and H_{4v-vi} option summing-determined lure of choice hypotheses, respectively). The contrast hypothesis predicted that the proportion choosing the target in the high-contrast condition would exceed that in the low-contrast condition. There was a very small difference in the predicted direction between groups, but this was far from significant, $\chi^2 (1) = 0.10$, n.s. The summing hypothesis predicted that target choice would be greatest in the three-choice condition, intermediate in the low-contrast condition, and least in the high-contrast condition. The observed choice proportions were (non-significantly and trivially) in the opposite direction. It appears that the relative relationship between the criteria of the choice options is not necessarily a determining factor in the lure of choice. In fact, there were no significant differences between any of the choice conditions ($\chi^2 (4) = 2.82$, n.s.). This suggests that the lure of choice has less to do with the relationships between the lure option and the target than to do with the presence of choice *per se*. This possibility is developed in greater detail in the next two empirical chapters.

3.7. Summary and general discussion of Studies 1- 4

These studies concern cases where people were offered a choice between a single option and a further 'illusory choice,' in which one option was superior to the others and so will usually be chosen. A lure of choice was demonstrated in nearly

every choice condition of every study, showing that the frequency with which an option is ultimately chosen increased when it is first offered as part of an illusory choice set than when it is offered alone. This was demonstrated in several studies, using two different methods with both gambles and more realistic scenarios. In nearly every condition of Studies 1-4 violations of the *regularity* condition were observed, in that pairing a target option with a lure significantly increased the 'market share' of that target.

Several possible explanations for the lure of choice were ruled out. Study 4 showed that it was independent of the specific value of the lure or lures, indicating that it could not be explained by a contrast effect (in which the better item in a choice pair looked even better when offered with a relatively inferior alternative, and that attractiveness is related to the relative superiority) or by a summing effect (in which all the options were added up, possibly in the mistaken belief that all the options in the choice set were available).

However, a number of issues remain to be resolved. For example, why do some people, on reaching Stage 2, select the lure option which is inferior in terms of EV? This appeared to be more common in situations when the target is paired with a lure that was in conflict with it on the dimensions of payoff and probability (for instance in Study 2 and Study 3's conflicted-choice conditions where 9% and 24% respectively chose the lure at Stage 2). One explanation is that when faced with the choice at Stage 2 between the target and the lure, some people adopted a risk-averse stance, and opted for the lure (which in both cases had a probability of .9 compared with .75 for the target options). This seems somewhat unlikely however, given that they had already been willing to gamble on a lottery with probability .8 at Stage 1 to enable them to reach Stage 2.

A potentially more straightforward explanation is that some people have difficulty calculating and comparing the expected values of a number of alternatives, (Dhar, 1997; Hauser & Wernerfelt, 1990; Huffman & Kahn, 1998; Luce, 1998; Tversky & Shafir, 1992b) and when the relative values of options is not transparent (as in the cases of the conflicted-choice conditions of Studies 1-4), they either miscalculate or simply guess. This would explain why the proportion of people selecting the lure in the conflicted-choice condition of Study 3 was greater than that in the comparable conflicted-choice condition of Study 2: in Study 3, the EV of the conflicted lure was 18, much closer to the target than in Study 2, where it was only 9 (both targets had EVs of 22.5). The closer the EVs of alternatives, potentially the greater the possibility of miscalculation or confusion which could have led to "irrational" choice behaviour. For this reason, most of the studies reported in the rest of this thesis moved away from classic gambles and the associated probability-naivety of people, and concentrated on choices described in potentially more straightforward ways.

There is another unresolved question: if choice is attractive, why is more choice not even more attractive? The lack of a significant result in the three-choice condition of Study 4 can perhaps be accounted for in two ways. First, it is possible that the issue mentioned above regarding people's inability or unwillingness to calculate and compare classic expected values is compounded when people are faced with more than two options. In this case, however, the lures were not conflicted, and the superiority of the target should have been obvious. This is reflected in the fact that nobody in this condition selected the lure option. Hence it seems that the second possibility is more plausible: people were simply not lured by the extra choice. This is in line with the findings of other researchers who argue that increased choice is unattractive or demotivating to people (Bettman, 1979; Chernev, 2003a; Iyengar &

Lepper, 2000). Desmeules (2002) suggested that there is an inverted U shape function of the relationship between variety and the positiveness of a consumption experience. To follow this argument to its logical conclusion, one might speculate that although people demonstrate a lure of choice with a small number of choice alternatives, increasing the number of these at Stage 2 beyond this range might result in a preference reversal in the opposite direction, that is, that more people would opt for the sure thing in conditions offering more choice. This possible nature of the relationship between the extent of choice and the lure of choice is examined explicitly in Study 9b and discussed further in Chapter 6 (Section 6.4.5).

This chapter has reported four studies in a particular context that taken together demonstrate convincingly a moderate but robust effect that has been coined the lure of choice. Although some potential explanations for the findings have been ruled out (contrast effects and inappropriate summing of options), it is clear that a more thorough test of possible theoretical explanations is required. In particular, it is necessary to establish the precise relationship between the lure of choice and the other well known choice effects discussed in Chapter 2. For example, event-splitting (see Section 2.5.7) is like the lure of choice in that both phenomena show how an increase in numerousness increases decision weight, but event-splitting differs from the lure of choice because in event-splitting the number of items is produced by subdividing one option into several, while in the lure of choice it is in placing several options side-by-side. Probably the most closely related context effect is the asymmetric dominance effect. The studies reported in Chapter 4 were designed to examine firstly the relationship between the lure of choice effect and existing documented context effects, particularly the asymmetric dominance effect. Secondly, they were designed to test whether the lure of choice is demonstrated in contexts other than lotteries (real or hypothetical).

Chapter 4: Floating lure studies: Relationship between the lure of choice and other context effects.

"When possible make the decisions now, even if action is in the future. A reviewed decision usually is better than one reached at the last moment."
William B. Given, Jr.

4.1. Introduction

On the basis of the evidence presented so far, when people choose, they can be lured by options that offer them a further choice, even when that choice is 'illusory' so that what they will eventually choose should be predictable (research questions i, ii and iii). In every choice condition but one of Studies 1 through 4, this lure of choice led to a significant violation of the regularity condition. These findings may, however, be related to findings relating to the asymmetric dominance effect (Huber et al., 1982) or the attraction effect (Simonson, 1989) as discussed in Chapter 2. This chapter reconsiders the asymmetric dominance effect as a potential explanation for the lure of choice and presents evidence to support the argument that the lure of choice is a separate, but possibly related effect. The focus therefore for the studies in this chapter is research question vi: "If people are attracted to choice, what are the possible underlying causes of this attraction?"

4.2. The asymmetric dominance effect revisited

Figure 10 plots the targets, sure things and lures offered in Studies 1-4 along the two dimensions of probability of receipt (pq for targets, pr for lures, and 1 for sure things), and the amount that could be won or earned. In these studies, the lure was superior to the sure thing on the payoff dimension, but usually at least weakly dominated by the target. Given that the target and the lure options in these studies were more closely related on the evaluative dimension of payoff than were the sure

thing and the lure, and were only ever presented alongside the target option (essentially in a triadic choice set), it is possible that the lure of choice might be related to the asymmetric dominance effect (see Figure 3, Chapter 2). The other context effects discussed in Chapter 2 (the similarity effect, the compromise effect and reference point effects) do not apply in this case due to the relative values of the choice options on the two dimensions.
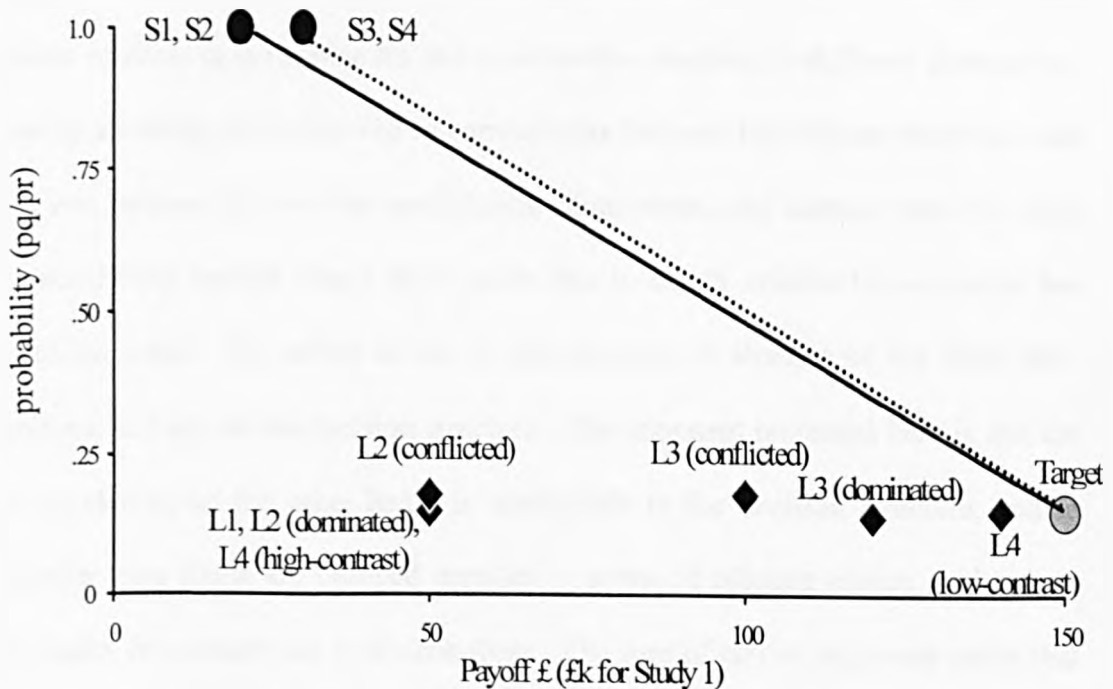
Figure 10. Plot of target, sure thing (S) and lure options (L) in Studies 1- 4 on the dimensions of payoff and probability that reward will be received (see pq/pr in Table 1). Numbers refer to study number and condition. Where more than one choice condition exists, this is specified in parentheses.

As discussed, the asymmetric dominance effect is shown by comparing two choice situations: in the control condition, the choice is between two options that conflict with one another (A and B, such as two cameras where the cheaper one is of lower quality); in the experimental condition, the choice is between the same two options and a third one that is dominated by A but not by B (e.g., the camera is more expensive than A but of poorer quality). The common result is that A is chosen more

often in the experimental condition. It is argued that because A is clearly better than the third decoy option, this increases the strength of the reasons for choosing A.

These findings are consistent with the lure of choice in that they show how the preference for one option over another depends not only on the relationship between the two options, but also on their relationships with other options. However, this thesis proposes that the asymmetric dominance effect and the lure of choice are fundamentally different. The asymmetric dominance effect is due to the number of items in the choice set and their relative standing on different dimensions. Broadly speaking, it is observed in comparisons between two choice situations, one with two options that conflict on different dimensions, and another with the same two conflicting options plus a third option that is clearly inferior to one option but not to the other. The effect is due to the presence or absence of the third item, therefore, and not on the decision structure. The argument presented here is that the lure of choice, on the other hand, *is* attributable to the decision structure, and in particular how items are grouped together in terms of offering choice, and not on how many items there are to choose from. The lure of choice argument states that given a choice between three items structured in the form of a choice between {A} and {B, C}, and then (if necessary) a choice between {B, C}, there will be more choices of B than in a situation in which the first choice is between {A, C} and {B}. The three studies reported in this chapter were conducted in order to tease apart the lure of choice and asymmetric dominance effects.

4.3. Overview of Studies 5-7

These studies were based on what was called a *floating lure* design. This kind of lure is different from those in the experiments reported in Chapter 3 where each lure was associated with only one target option. A floating lure can be paired

with any option, rendering it the target. The general structures of the two conditions
used in Studies 5-7 are illustrated in Figure 11.
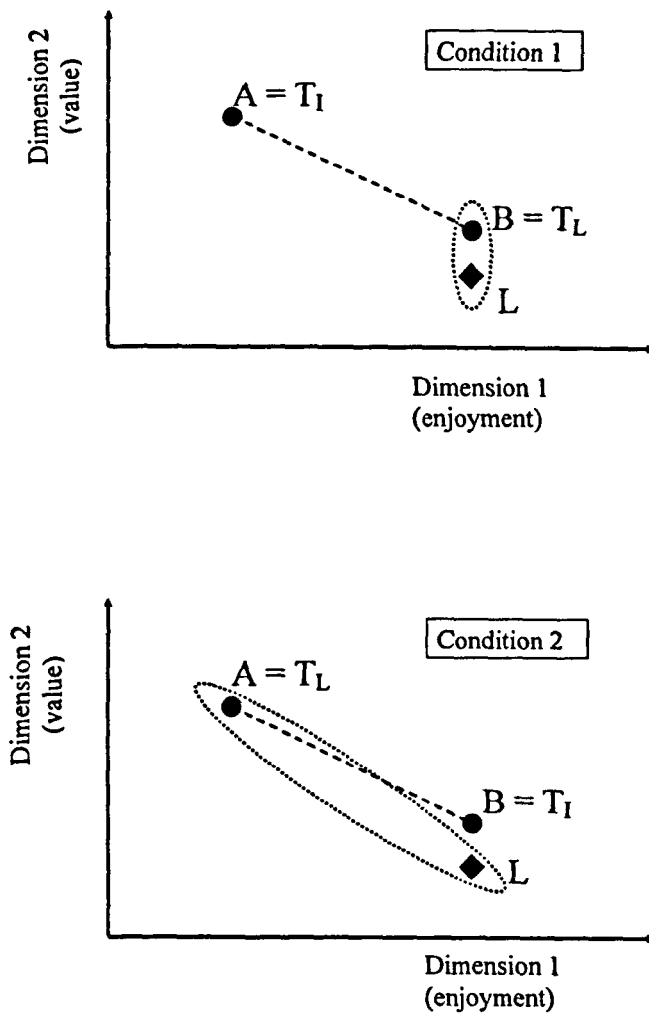
Figure 11. General structure of the two conditions in floating lure Studies 5–7.
Options A and B become T_{Lure} (T_L) and $T_{Isolation}$ (T_I) depending on whether it is
paired with the lure (L) or presented alone (in isolation). Examples of dimension
labels refer to Study 5.

All participants (in between-participant designs) chose between two targets
(pre-tested to establish equal desirability) and a lure. These were paired in such a
way that they made a choice between one target in isolation (target$_I$) and one target
paired with the lure (target$_L$). Both targets played the role of target$_I$ and target$_L$ for

different groups of participants. In other words, for half the participants the lure was paired with one target and for the other half it was paired with the other target.

With reference to the asymmetric dominance effect, L is the additional option that is dominated by B, but not A, where A would be considered a context or competitor option. In this specific design, the lure is dominated in such a way that it increased the range on the dimension on which B was inferior to the context option (A)[10]. An asymmetric dominance effect explanation would predict that the introduction of L would increase the attractiveness of B in *both* conditions, i.e. regardless of the particular presentation of options. An asymmetric dominance effect explanation would not offer any prediction about the influence of the way in which options are presented as pairs or otherwise.

In all these scenarios, all three options were presented simultaneously and were fully specified to participants. The options were paired in such a way that if people were sensitive to increased choice in the way that the lure of choice effect predicts, they should show an increased preference for *whichever* option (A or B) was presented as a pair with the lure item. In this way, their behaviour would contradict the predictions of the asymmetric dominance effect. More formally, these two approaches lead to competing general hypotheses:

> *Asymmetric dominance effect hypothesis: The presence of L will correspond with a preference for option B in both Condition 1 and Condition 2.*

> *Lure of choice hypothesis: The presence of L will correspond with a preference for T_L (option B in Condition 1, and option A in Condition 2).*

In line with the noted limitations of hypothetical gambles made in Chapter 3, Studies 5 and 6 used brief realistic scenarios selected in which everyday choices were replicated. The nature of these decisions meant that only a single option was viable, and that decision was final (participants could not "hedge their bets" through multiple choices). To counteract the drawbacks of using realistic scenarios as noted in Chapter 3, Study 7 incorporated more abstract gambles of the type used in Studies 1-4 within a realistic context.

4.4. Study 5

This study involved the choice of a nightclub. The scenario described a Friday night out with friends in a small town and the choice task was to decide which part of town to take a taxi to in order to spend the rest of the evening at a nightclub (see Appendix E for full details). The town depicted has three nightclubs that varied on the dimensions of *entrance charge* and *quality of experience/enjoyment* (see Figure 12). One target nightclub, Club Cherish, was cheap (£4) but did not play very good music, while the other, Club Diesel, was moderately expensive (£12) and played enjoyable music. The lure (Club Atom) was expensive (£15) and played enjoyable music. The three items were pre-tested (n = 48) in a direct choice (i.e. with no pairing of items), and it was found that preference was almost exactly split between the two targets, with nobody choosing Club Atom.

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[10] The range-increasing explanations for the asymmetric dominance effect are those that appear to have greater supporting evidence, e.g. Huber et al. (1982), Wedell (1991) (see Section 2.6.1-3).
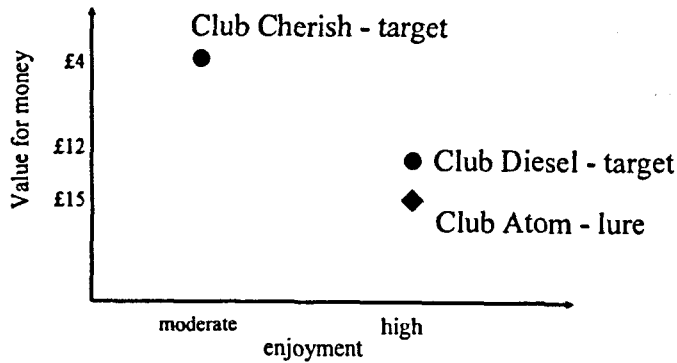
Figure 12. Relative dimensions of targets and lure in Study 5.

Participants read the entire scenario, and first decided where to take a taxi, to the north or south of the town. For half the subjects, the lure (Club Atom) was paired with Club Diesel, thus making this target$_L$ (equivalent to Condition 1 in Figure 11) and for the remainder the lure was paired with Club Cherish (as represented by Condition 2 in Figure 11). The side of town where the targets were located was systematically varied between subjects. After deciding which direction to send the taxi, participants who opted for the area with two clubs then immediately chose the one nightclub they preferred. The primary dependent measure was whether the respondent directed a taxi towards the north or the south of the town, specifically whether this was the direction where there were two nightclubs or one, and the secondary measure was the market share of the two targets, depending on whether they were paired with the lure club or were alone (i.e. designated T_L or T_1).

In terms of the general hypotheses introduced above, given the pre-tested preference equivalence between club Diesel and Club Cherish, the asymmetric dominance effect would predict a preference for Club Diesel, regardless of where Club Atom was located. The lure of choice would predict a preference for whichever

club (Diesel or Cherish) was offered as part of a choice set alongside Club Atom (i.e. located in the same part of town). That is:

H5$_i$ (asymmetric dominance effect hypothesis): The presence of Club Atom will correspond to a preference for Club Diesel both in Condition 1 and Condition 2.

H5$_{ii}$ (lure of choice hypothesis): The presence of Club Atom will correspond to a preference for T$_L$ (Club Diesel in Condition 1, and Club Cherish in Condition 2).

Participants were 150 members of the general public (68% female, mean age 23.2 years) approached in a shopping centre on a weekday morning (over a period of two days). They were randomly allocated to an experimental condition.

4.4.1. Results and discussion of Study 5

Results are presented in Table 6. Analysis revealed that the distribution of choices differed between conditions (χ^2 (2) = 12.42, *p* < .01, Cramer's V = .29). As can be seen in Table 6, the overall market share of both clubs was increased when they were paired with the lure. Club Diesel's share increased by 24% and Club Cherish's by 9%. A further third-way analysis that excluded choices of lures from the analysis revealed that this increase in choices of the same club when it was target$_L$ over when it was target$_i$ was significant (χ^2 (1) = 4.42, *p* < .05, Cramer's V = .18), a low to moderate effect size (de Vaus, 2002).

	Choice		
Target$_L$	Club Cherish	Club Diesel	Club Atom
Including lure choices			
Club Diesel (N = 75)	36	60	4
Club Cherish (N = 75)	45	36	19
Excluding lure choices			
Club Diesel (N = 72)	37	63	-
Club Cherish (N = 61)	56	44	-

Table 6. Results of Study 5, Nightclub scenario. Numbers represent percentage choosing each alternative. Club Atom, the floating lure, was paired with the item designated Target$_L$ in each row.

Thus, in this case, the findings support *H5$_{ii}$, the lure of choice hypothesis*: there was a significant preference for whichever target was paired the lure, rather than *H5$_i$, the asymmetric dominance effect hypothesis* which predicted a preference for the dominating item (Club Diesel). However, despite efforts to ensure that their decisions were considered singular and final, it is possible that extraneous context factors may have influenced participants towards selecting an area of town where a number of options were available (for example, people may have been influenced towards target$_L$ for reasons such as if one nightclub turned out to be unenjoyable, an alternative would be available nearby, or that one would have a better time in an area of town in which there was a party "atmosphere" reflected by a number of nightclubs in the same area). The next study was designed to test further the differing predictions of the lure of choice and the asymmetric dominance effect in a scenario where the undue influence of contextual features is minimised. Furthermore, a lure with a slightly different relationship to the targets was used.

4.5. Study 6

In Study 6, participants were asked to imagine that they had inherited some money, £5,000 of which they had decided to invest in a savings account. Their

choice had been narrowed down to three savings accounts in two banks (see Appendix F); with one bank offering two possible accounts, the other offering one. Two of the accounts were targets. Account 1 offered 6.1% interest with 60 days notice for withdrawals, Account 2 offered 5% interest with instant access. The floating lure (Account 3 in Figure 13) account offered 6% interest with 45 days notice. Direct preference for these accounts was pre-tested, and relative dimensions adjusted until the dimensions of the two targets led to roughly equal preferences for the two target accounts. Whereas the floating lure in Study 5 was more closely related to, and dominated by Club Diesel, the floating lure in this instance was in conflict with both targets (better on one dimension and worse on the other). There is evidence that the asymmetric dominance effect also occurs with sub-optimal, but not necessarily strictly dominated decoys (Huber & Puto, 1983), which in this case should correspond to an increased number of people selecting Account 1.
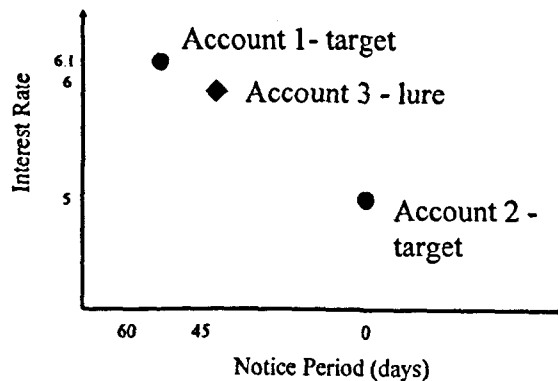
Figure 13. Relative dimensions of targets and lure in Study 6.

For half of the participants the lure was paired with the high interest account, and for the other half it was paired with the low interest account. Participants decided which bank they were going to visit, and if they selected the two-account bank they then chose one of the two accounts in which to deposit their money. As in

Study 5, the order in which the options were presented on the page (top/bottom, right/left) was counterbalanced. Formally put, the hypotheses for this study were:

H6ᵢ (asymmetric dominance effect hypothesis): The presence of Account 3 will correspond with a preference for Account 1, regardless of which target it is paired with.

H6ᵢᵢ (lure of choice hypothesis): The presence of Account 3 will correspond with a preference for T_L (i.e. whichever account it is paired with in that condition).

The primary dependent measure was whether the respondent chose to go to Bank J or Bank K, specifically whether this was the bank which offered one or two accounts, and the secondary measure was the market share of the two targets, depending on whether they were paired with the lure or were alone (i.e. designated T_L or T_I).

Participants were 100 visitors recruited on a weekday morning at the same shopping centre as Study 5, who had not been involved with the earlier study. The sample comprised 64% female, mean age 26.6 years. They were randomly allocated to one of the two experimental conditions.

4.5.1. Results and discussion of Study 6

Results of Study 6 are summarised in Table 7. An overall Chi-square analysis revealed that the distribution of responses differed between conditions (χ^2 (2) = 6.87, $p < .05$, Cramer's V = .26). More people chose each target account when it was paired with a lure than when it was unpaired – the advantage was 26% for

Account 1, the high interest account, and 16% for Account 2, the low interest account. Consistent with this observation, a third-way analysis excluding those selecting the lure (Account 3), revealed a low-to-moderate significant effect of condition (χ^2 (1) = 4.93, $p < .05$, Cramer's V = .24).

	Choice		
Target$_L$	Account 1 6.1%/60 Days	Account 2 5.0%/instant access	Account 3 6.0%/45 days
Account 1: 6.1%, 60 days (N = 50)	68	22	10
Account 2: 5%, instant access (N = 50)	42	38	20
Excluding lure choices			
6.1%, 60 days (N = 45)	76	24	-
5.0%, instant access (N = 40)	52	48	-

Table 7. Results of Study 6, Bank scenario. Numbers represent percentage choosing each alternative. The 6%, 45 days account (Account 3) is the floating lure option and was paired with the account designated as Target$_L$ in each row.

Once again, there was no evidence to support *H6$_i$*, *the asymmetric dominance effect hypothesis*, as a clear preference for Account 1 was not demonstrated in both conditions. There was evidence support *H6$_{ii}$*, *the lure of choice hypothesis*, as a preference swing is demonstrated across conditions. Like the conflicted-choice conditions of Studies 2 and 3, the result was not a perfect symmetrical preference reversal, a finding most probably tempered by the relatively large number of people who selected the lure option, especially when it was paired with Account 2. Once again this seems to correspond with the extent to which the target option's superiority is obscured. As noted elsewhere (Tversky & Shafir, 1992b; Gourville & Soman, 2005), people appear to have some difficulty making tradeoffs and perhaps more so when deciding between an account with different major characteristics (5% interest and instant access to be traded off against 6% interest and 45 days access).

Interestingly, this reasoning suggests that the tradeoffs to be made are mostly between the pair of options, and not all three options (in which case there ought to be

no differences between conditions in difficulties encountered, nor the numbers selecting the lure option). It would seem that people may be lured towards the pair of options, and *then* decide between the two remaining viable options (requiring the relative tradeoffs), rather than choosing the outcome they want first and then following the route required to reach it. The work of Brenner et al. (1999) and Sood et al. (2004), discussed in Section 2.9.2 would support this view, although these authors argued that the outcome of this process damages the attractiveness of those items presented in the choice set, a contrary finding to the lure of choice (a view investigated more fully in Chapter 5). This two-stage trade off behaviour could be due to either a way of simplifying the task (tradeoffs required between two options rather than three) or being a mechanism for "staying in the game" or momentarily delaying the final decision. Both of these possibilities are discussed later in this chapter and in Chapter 6.

The findings of Study 5 and 6 demonstrate the lure of choice in situations quite different from those of the earlier studies. In particular, they confirm that it is not a further instantiation of the asymmetric dominance effect, and that people appear to like options that offer them choice, even when this means they may not select options they would otherwise have done.

4.6. Study 7

Study 7 was designed to test participants' responses using the floating-lure design in a scenario offering more experimental control over subjective expected utility. As mentioned before, semi-realistic scenarios such as those used in Studies 5 and 6 have high face validity and are motivating, yet may detract participants with interesting surface characteristics. Such detraction is not necessarily unwarranted in many real life situations. For example, in a real life scenario such as the Nightclub

scenario of Study 5 it is not unreasonable that people may have decided that having two clubs close together enhanced the subjective utility of either of them (in case one was closed when they got there, or they decided to leave one to try the other). This hedging of bets might be one of the reasons why the lure of choice has developed, and is discussed in much greater detail in Chapter 6. However, the interesting question for this study was whether the tendency for people to be attracted in the direction of choice still remained *when only one option was allowed*, and the possibility of changing one's mind was not available because the decision was one-off and finite. If it did remain, this suggests that the lure of choice may be some kind of behavioural decision heuristic (as described in Chapter 2, Section 2.7) which although often used to our advantage, may be also used in situations in which it is not the most appropriate strategy.

Related to this point, this study also tested whether the lure of choice effect was eliminated by removing the part of the decision process that allowed people to select an option that retains the possibility for them to exercise further choice. In a straightforward choice between the options with no first stage (with other factors, such as the physical proximity of the options and contextual factors remaining the same), does the lure of choice remain? This would indicate whether the lure of choice preference reversal witnessed in Studies 5 and 6 was due to physical proximity of alternatives or attributable to the explicit pairing of items into choice sets.

In this study there were four experimental and four control conditions. Participants were asked to imagine that they were at a casino, and had a single token left to spend on a roulette-type game, which Hacking (1965) calls a *chance setup*. (See Appendix G for materials). In each condition there was a choice of three spinners, of which two were targets and one a floating lure. For all conditions, the

two targets were: the chance of winning £50 with probability .45 and nothing with probability .55 (T_1) and the chance of winning £60 with probability .375 and nothing with probability .625 (T_2). The expected values of these two options are the same (£22.5). In the two dominated lure conditions and the two corresponding control conditions, the lure option was the chance of winning £50 with probability .375 and nothing with probability .625 (expected value £18.75). In other words, it was dominated by both targets, each dominating it on a different dimension, either payoff or probability. In the two conflicted lure conditions and corresponding control conditions, the lure offered the chance of winning £40 with a probability of .47 and nothing with probability .63 (expected value £18.75). In this case, therefore, it was in conflict with both targets (that is, had a higher probability, but a lower potential payoff). The relative dimensions of the different options are detailed in Figure 14.
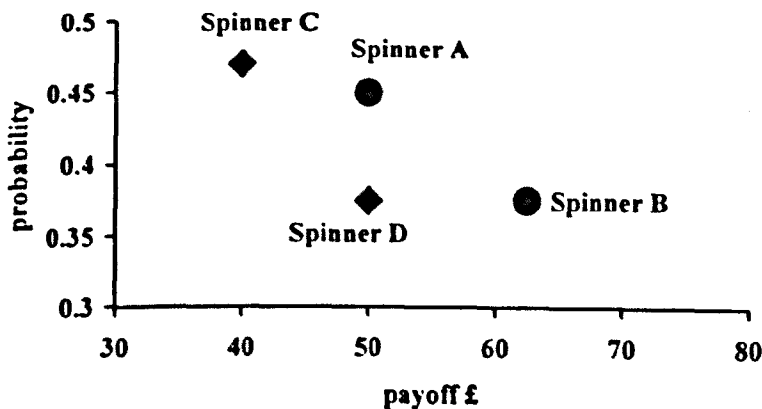
Figure 14. Relative dimensions of targets and lures in Study 7. Spinners A and B are the targets, and play the role of both Target$_1$ and Target$_L$. Spinner C is the conflicted floating lure, and Spinner D is the dominated floating lure.

For the participants in half the experimental conditions the floating lure was explicitly paired with T_1 thereby rendering that option target$_L$ and for the others it was paired with T_2. The pairing was made explicit by locating target$_L$ and the lure at the same table in the casino (see Figure 15). The instructions given to participants in

the experimental conditions were "Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are two tables offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on. Choose the table at which you would like to spend your token." The position of each table (left or right of the page) and the spinners on each table (top or bottom) were systematically varied across experimental conditions.

Table 1   Table 2
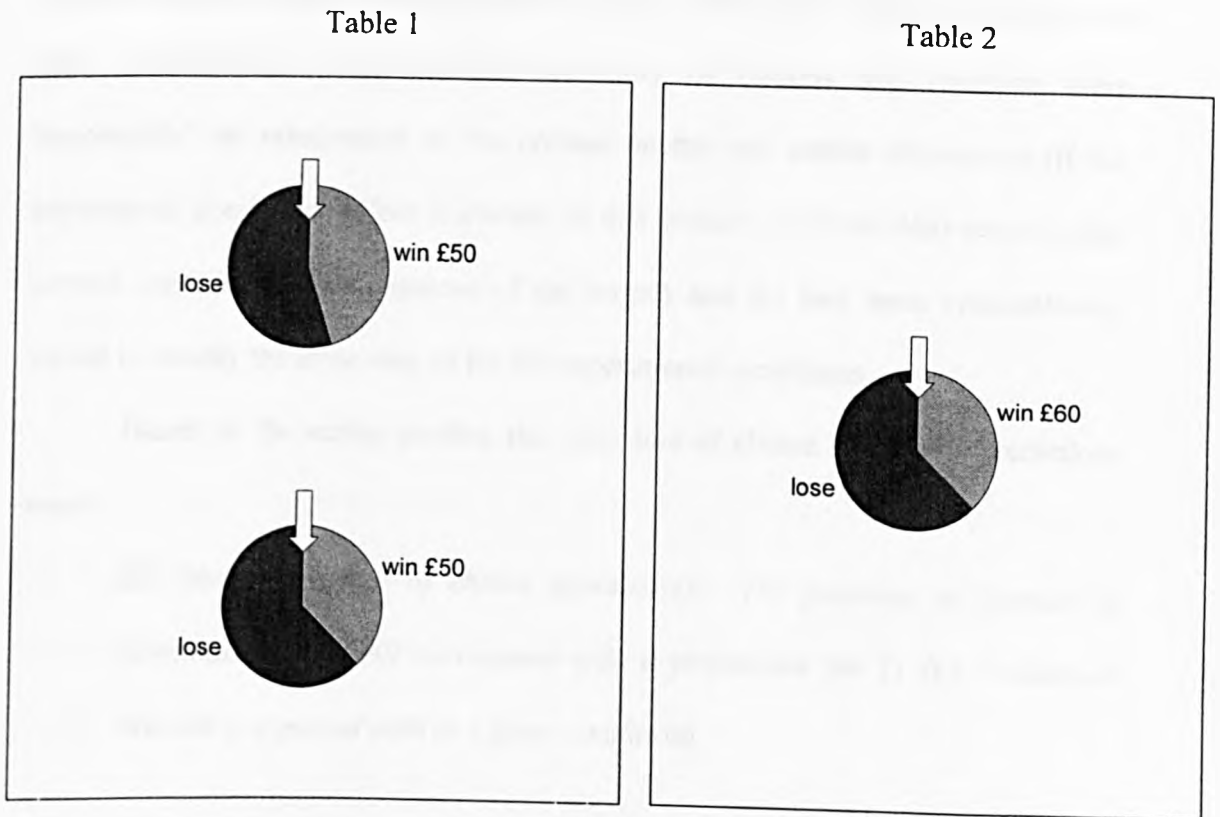
Figure 15. Example of presentation of choice options in Study 7 (dominated lure condition - Spinner A (T_1) paired with lure D on left-hand side and Spinner B (T_2) presented alone on right-hand side).

As mentioned, one aim was to rule out the possibility that the physical proximity rather than the pairing of options together in the materials rendered target$_L$ preferable to target$_I$. Therefore, the control conditions offered a *direct* choice

(without pairings) between exactly the same options, in precisely the same physical locations on the page. The instructions for control participants were "Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are three games offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on. Choose the spinner at which you would like to spend your token." These participants do not have the chance to select an option that provides greater choice, and therefore the only effects that should be evident are those attributable to the physical proximity of options and (perhaps more importantly) the relationship of the options on the two salient dimensions (if the asymmetric dominance effect is evident in this context, it should also occur in this control condition). The positions of the targets and the lure were systematically varied in exactly the same way as for the experimental conditions.

Based on the earlier studies, the basic lure of choice hypothesis predictions were:

H7$_i$ (dominated lure of choice hypothesis): The presence of Spinner D (dominated lure) will correspond with a preference for T$_L$ (i.e. whichever account it is paired with in a given condition).

H7ii (conflicted lure of hypothesis): The presence of Spinner C (conflicted lure) will correspond with a preference for T$_L$ (i.e. whichever account it is paired with in a given condition).

On the other hand, a competing explanation reflecting the asymmetric dominance effect would predict:

H7$_{iii}$ (asymmetric dominance effect hypothesis): The presence of Spinner C (conflicted lure) will correspond with a preference for Spinner A (regardless of which account it is paired with it).

There is no corresponding asymmetric dominance effect hypothesis for the dominated lure condition, because the lure in this condition is not asymmetrically dominated, it is dominated by both targets. The control conditions allowed the following prediction to be tested:

H7$_{iv}$ (physical proximity versus explicit pairing hypothesis): The preference reversal known as the lure of choice will only be demonstrated when the floating lure (Spinner D or C) is explicitly paired with T$_L$, and not when the physical proximity is the same, but with no explicit pairing (control conditions).

The primary dependent measure for the experimental conditions was which table the respondent chose to spend their token at, specifically whether this was the one with two spinners or one, and the secondary measure was the market share of the two targets, depending on whether they were paired with the lure or were alone (i.e. designated T$_L$ or T$_I$).

Participants were 469 undergraduate management students, not involved with any previous study who volunteered to take part (55% female, mean age 18.8 years). They were randomly allocated to conditions.

4.6.1. Results and discussion of Study 7

Tables 8a and 8b illustrate the choice preferences of participants. The upper four rows show the results for the experimental conditions, and below are their

corresponding control conditions. The pattern of results for the experimental conditions was a familiar one. For the dominated lure condition (n = 130) there was a slight preference reversal in favour of whichever target gamble was paired with the lure; when Spinner A was paired with the lure it was chosen by 54% of the participants, compared with 43% when it was presented alone. Similarly, when Spinner B was presented as target$_L$, it was preferred by 57%, compared with 46% when it was alone, although this failed to reach significance (χ^2 (1) = 1.56, p = .46, n.s., *third way analysis*). Hence there was evidence to support *H7i*, the *dominated lure of choice hypothesis*. This result is interesting, as in previous studies, all dominated lures had been associated with the lure of choice effect, and in those studies that contained both conflicted and dominated lures (Studies 2 and 3), the dominated lure's effect had tended to be more distinctive than the conflicted one. One explanation for this result could be that the pictorial representations used in this study made tradeoffs between relative values of options on probability and payoffs more difficult than anticipated.

	Choice		
Target$_L$	Spinner A £50 with probability .45	Spinner B £62.5 with probability .375	Dominated Lure Spinner D £50 with probability .375
Experimental conditions			
Spinner A (N = 65)	52	45	3
Spinner B (N = 65)	42	55	3
Excluding lure choices			
Spinner A (N = 63)	54	46	-
Spinner B (N = 63)	43	57	-
Control condition (no explicit pairing)			
Spinner A (N = 53)	66	34	0
Spinner B (N = 56)	86	14	0

Table 8a. Results of Study 7, Casino scenario – Dominated lure condition. Numbers represent percentage choosing each alternative. Spinner D is the floating lure option and was paired with the account designated as Target$_L$ in each row.

The conflicted lure condition (n = 127) showed a stronger lure of choice effect (see Table 8b), overall χ^2 (2) = 7.53, $p < .05$, Cramer's V = .24). A third way analysis revealed that 65% preferred Spinner A when it was target$_L$ compared with 39% when it was target$_I$. In the same way, 61% chose Spinner B when it was target$_L$ compared with 35% when it was presented alone (χ^2 (1) = 7.45, $p < .01$, Cramer's V = .27), thus offering support for *H7$_{ii}$, the conflicted lure of choice hypothesis.* These effect sizes are low to moderate (de Vaus, 2002).

| | Choice | | |
Target$_L$	Spinner A £50 with probability .45	Spinner B £62.5 with probability .375	Conflicted Lure Spinner C £40 with probability .40
Experimental conditions			
Spinner A (N = 63)	54	29	17
Spinner B (N = 64)	33	52	16
Excluding lure choices			
Spinner A (N = 52)	65	35	-
Spinner B (N = 54)	39	61	-
Control condition (no explicit pairing)			
Spinner A (N = 53)	66	17	17
Spinner B (N = 50)	56	24	20

Table 8b. Results of Study 7, Casino scenario – Conflicted lure condition. Numbers represent percentage choosing each alternative. Spinner C is the floating lure option and was paired with the account designated as Target$_L$ in each row.

The asymmetric dominance effect hypothesis *(H7$_{iii}$)* was rejected. The presence of Spinner C (conflicted lure) did not correspond with an overall preference for Spinner A. This preference switched to Spinner B when it was paired with the lure.

These results are clearer when considered in the light of those from the control conditions (n's = 109 and 103 for dominated lure control and conflicted lure control, respectively). Across both the dominated and the conflicted lure control conditions, there was a strong preference for Spinner A, regardless of whether or not

it was presented in close proximity to the lure (that is, as target$_L$). Critical statistics for the dominated lure control condition were (χ^2 (2) = 5.80, p < .05, Cramer's V = .23), a significant effect attributable to the large number choosing Spinner B when it was target$_L$, rather than a caused by a preference reversal and for the conflicted lure control condition (χ^2 (2) = 1.17, p = .56, Cramer's V = .11). These findings provided support for *H7$_{iv}$*, the *physical proximity versus explicit pairing hypothesis*, indicating that the preference reversal witnessed was caused by the explicit paring of the targets with the conflicted lure, and not because of the relative physical locality of the pairs. This preference for Spinner A suggests that when the items were not explicitly paired, the asymmetric dominance effect was able to operate (on the basis that target items were pre-tested to establish roughly equal preferences). However, without a condition that compares preferences between the targets without the lure (or decoy) option C, it cannot be confirmed that this distribution was caused by the asymmetric dominance effect.

Overall, Study 7 suggests that the preference reversals and violation of regularity witnessed thus far cannot be attributed to the physical pairing of options that made the superior one seem more attractive (the attraction effect) alone, and required the explicit pairing of options into choice sets. Indeed, by simply removing the possibility for participants to follow a route to choice, the preference reversal was eliminated.

4.7. Summary and discussion of Studies 5, 6 and 7

Studies 5, 6 and 7 showed that when an identical set of items is on the table, with two items offered as a choice pair, and one offered alone, a target item was chosen more frequently when it was offered as part of a pair than when it was offered

separately. These findings constitute a violation of *procedure invariance*, according to which normatively identical problems should lead to identical decisions (Tversky, Sattath & Slovic, 1988). It is now known that this principle is often violated, and a widely accepted view is that people often do not have definite preferences between options, but actually construct their preferences based on such factors as the context of choice and the way it is to be expressed (e.g. Bettman et al.,1998, see Section 2.4). The lure of choice appears to be an additional factor determining what preferences are constructed from a particular set of options.

Moreover, these studies showed that whilst sharing some similarities, the lure of choice is not just another version of the asymmetric dominance effect. Broadly speaking, similarities hinge on the fact that altering in some way the array from which people can chose can fundamentally change their preferences. The two classes of phenomena differ, however, in that attraction and compromise effects occur when the choice set is changed, but the lure of choice occurs when the choice set is held constant but the decision structure is changed.

Even when participants always had three options available, they generally preferred a choice to a no-choice option even if that meant they ended up with an ultimate option that was not as good (when they ended up choosing the lure option, as was the case of Studies 5, 6 and conflicted lure condition of Study 7), or was at least different to that which they would otherwise have chosen (on the basis that target options were preferred equally in pre-testing).

Furthermore, two of the main theoretical accounts for the asymmetric dominance effect, the range-increasing account, (Huber et al., 1982, see Section 2.6.1) and frequency-increasing account (Huber et al., 1982, see Section 2.6.2) could not be applied to the results demonstrated here. Neither increasing the range on which one target was weakest, nor adding a level on the dimension on which one

target was strongest had the one-sided preference increases that these explanations would suggest. However, the emergent value account for the asymmetric dominance effect (Pettibone & Wedell, 2000; Wedell & Pettibone, 1996, see Section 2.6.3) shares some characteristics with the explanation of the lure of choice to be examined next, in particular, that people rely on more qualitative comparisons (akin to the use of heuristics), such as the fact that domination makes the selection of a particular target easier to justify.

The lure of choice may be a manifestation of a more general desire to defer commitment for as long as possible. This may be related to the effect discussed by Bastardi and Shafir (1998; see also Shafir et al., 1993), in which people like to search for information beyond the point where it is beneficial (reviewed in Section 2.6.4). For instance, to use one of Bastardi and Shafir's examples, a student deciding whether to take a course might wait to find out whether the professor has a good or bad reputation, even when the knowledge is irrelevant to his or her decision. Bastardi and Shafir's studies suggest that people often unnecessarily delay commitment until all information is gathered. Choosing a choice-path gives people another way to defer making a final and irrevocable commitment. It does not eliminate all commitment, of course, since choosing can mean the loss of potentially desirable outcomes. For instance, in Studies 5-7, choosing a choice-rich route meant a commitment to not getting target₁.

The emerging pattern of results supports the suggestion that the lure of choice is an example of a simplifying choice heuristic, such as 'it is better to choose from a larger selection than a smaller one.' This is consistent with Payne et al.'s (1993) suggestion that, all things being equal, an easier to implement procedure will be chosen over a more taxing one. An easy way to choose a cinema, for instance, is to choose the one with the most screens, without bothering to consider what is showing

on those screens. Such a mechanism may account for why, in Study 5, many participants chose the lure (Club Atom) when it conflicted with target$_L$ (in this case, the 'cheap and cheerful' Club Cherish) than when it was dominated by it (Club Diesel). If the first decision was made on the basis of the 'choice is better' heuristic, then the first time the options were explicitly compared might have been at the ensuing pairwise choice stage. In the conflicting choice scenario, if the cover charge was more important to the participant, then Cherish was chosen; but if the quality of experience was more important, then the lure was chosen – even though the lure was dominated by Club Diesel, which was no longer available. This kind of asymmetry, also reflected in the bank scenario in Study 6 and Study 3 (and to a lesser degree in the conflicted lure condition of Study 2) suggests that people were not thinking through all the options before making their decisions, but were first making the very simple decision of choosing on the basis of the presence or absence of a further choice between options, and only after they have taken the choice path did they give in-depth examination to the options that were then available. This suggests that a lot of the decision making in the choice conditions of these studies was driven by a preference for choice itself, and not necessarily by the options on offer (an idea that is developed in greater detail in Chapter 6).

The set of empirical studies reported in the following chapter extend investigations of the lure of choice into different experimental domains, and examine the idea of the lure of choice as a decision heuristic in more detail.

Chapter 5. Follow up studies: Assessing the roots of the lure of choice.

"The more alternatives, the more difficult the choice." Abbe' D'Allanival.

5.1. Introduction

The lure of choice has now been demonstrated in seven different studies, using a number of different methodologies with a variety of participants. A number of alternative explanations and potential mechanisms underlying the effect have been ruled out. This chapter describes three studies designed to address some further issues regarding the lure of choice, in particular the range of contexts in which the lure of choice is demonstrable. It also reports how the lure of choice relates to other published research with apparently contradictory findings.

Specifically, the studies reported here were designed to concentrate on the following three research questions (iv-vi): "If people are attracted to choice, are there certain kinds of choice that are more attractive than others?" "If people are attracted to choice, is there a point at which too much choice is unattractive, and people are detracted from it?" and "If people are attracted to choice, what are the possible underlying causes of this attraction?" The first study used a well known, widely-cited decision problem that lends itself well to investigating the lure of choice, and the other two studies replicated a piece of work which seems to directly contradict the lure of choice.

5.2. Study 8[11]

This study used a variant of a problem that has undergone considerable academic scrutiny – the Monty Hall problem (Granberg & Brown, 1995; Nickerson,

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[11] This study was conducted in collaboration with Barbara Summers and Daniel Read, who have given their permission for this work to be presented here (see Bown et al., 2003).

1996). Three versions of the Monty Hall problem were tested. The first was the traditional 3-door problem. The others were 4-door problems, with and without a lure of choice element.

In the traditional two-stage Monty Hall Problem a contestant (or participant) is shown three doors, behind one of which a prize is hidden. The contestant is told he or she will win the prize if they select the right door. They first choose a door. This door is not opened, however, but the knowledgeable host opens *another* door to show it does not conceal the prize. There are now two unopened doors, the chosen and unchosen one. The contestant is then given the option of sticking with their originally chosen door, or switching to the unchosen one. The correct, but strongly counter-intuitive, solution is to switch, which gives a two-thirds probability of winning[12] (see Baron, 2000; Mosteller, 1965; Selvin, 1975; Shaughnessy & Dick, 1991).

The scenario was described to participants using a row of boxes to represent the doors. An experimenter explained the scenario to participants in the following way: "I want you to imagine a TV game show. In the show the contestant who wins in the early rounds gets a chance to go for the star prize. On the game show set there are three (*four*) doors, represented by these three (*four*) boxes. The host says that the star prize, a Ferrari, is in one of the boxes and that if the contestant chooses correctly he or she will win it. The other boxes contain goats, which are the consolation prizes. He then asks the contestant to choose a box". At this stage one participant, volunteered or chosen at random, chose a box. The experimenter then opened one of the other boxes that did not contain a prize, and announced that "The host now says 'you have chosen this box but before you open your box, I'm going to give you the

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[12] The probability of winning by switching is $(N-1) / [N(N-n-1)]$, where N = total number of doors and n = number of incorrect alternatives revealed (Selvin, 1975).

chance to change your mind.'" All participants observed this and then answered the experimental questionnaire (see Appendix H).

In all conditions participants first learned that "You are a contestant in the game show described. Initially you have chosen box K". There were three conditions: The *standard* three-door condition; the four-door *choose-a-door* (CAD) condition; and the four-door *choose-a-choice* (CAC) condition. In the *three-door* version participants were asked whether they wished to stick with Box K or switch to Box L (the other unopened box), in the *four-door* versions they could switch to either Box L or M (the two remaining unopened boxes). In the four door versions, the probability of winning by switching is 3/8, compared to 2/8 for sticking.

In the choose-a-door condition after the experimenter opened one of the boxes, participants simply specified whether they wanted Box K (their original selection) or Box L or Box M. In the choose-a-choice condition participants had the option to either stick with Box K or "Choose to switch to one of the other two boxes (L or M). You don't need to decide yet which box you will finally choose". The usual finding, *"the Monty effect,"* is that people are reluctant to switch, regardless of whether there are one or two alternative doors to choose from:

> *H8i (the Monty hypothesis): The majority of people will stick to Box K in the three-door, CAD and choose-a-choice conditions.*

The lure of choice effect predicts that participants will be attracted to the opportunity of choice in the choose-a-choice condition, and will therefore switch more often in the choose-a-choice condition than in the choose-a-door condition. It makes no predictions regarding behaviour in the three-door condition because there is no choice offered here.

H8$_{ii}$ (lure of choice hypothesis): More people will switch in the choose-a-choice condition than in the choose-a-door condition.

Participants were 373 undergraduate management students who volunteered to take part during class time (45% female, mean age 19.4 years). The participants in each class in which data was collected were randomly allocated to one of the three experimental conditions.

5.2.1. Results and discussion of Study 8

Table 9 shows the proportion choosing to switch in the three conditions.

Condition	Choice	
	Stick	Switch
Standard 3 door (N = 103)	86	14
4 door Choose-A-Door CAD (N = 138)	78	22
4 door Choose-A-Choice CAC (N = 132)	66	34

Table 9. Results of Study 8. Numbers represent percentage participants sticking with original selection or switching in 3-door and 4-door Choose-A-Door (CAD) and Choose-A-Choice (CAC) conditions. In the CAD condition participants switched to a named alternative, in the CAC condition they switched to either alternative, without specifying which.

As usual in studies of the Monty Hall problem, very few participants switched in the standard condition, and the difference between the standard and choose-a-door conditions was not significant (χ^2 (1) = 2.62, n.s., Cramer's V = .10). This is consistent with Granberg and Dorr (1998) who found no significant difference in switching behavior for three, five and seven doors. On the other hand, significantly more participants switched in the choose-a-choice than in both the standard condition (χ^2 (1) = 12.93, p < .001, Cramer's V = .24) and the choose-a-door condition, (χ^2 (1) = 5.13, p < .05, Cramer's V = .14). This demonstrates the

lure of choice and offers evidence for *H8ᵢᵢ, the lure of choice hypothesis* but not *H8ᵢ, the Monty hypothesis,* specifically for the choose-a-choice condition. Although identical in every other respect, being able to switch (and having to commit to) a particular option in the choose-a-door condition was not as attractive as retaining the option of choosing at a later point in the choose-a-choice condition.

The lure of choice in Study 8 can be seen as yet another violation of regularity (Shafir et al., 1993; Tversky & Simonson, 1993). Formally, the regularity condition states that the proportion of times A is chosen from {A or B or C} cannot exceed the proportion of times it is chosen from {A or B}. In the standard condition participants chose one from {K or L}, and in the choose-a-choice condition they chose one of {K or (L or M)}, where the inner parentheses denotes the second decision. When option M was added, more than twice as many people chose (L or M) than chose L in the standard condition. This occurred even though the value of L was reduced from a 2/3 chance of winning in the standard condition to a 3/8 chance in the choose-a-choice condition.

A possible explanation for this finding which is especially applicable to the Monty Hall, but also the three-spinner problems of Study 7, is that choosing the alternative that offers more choice allowed participants to 'stay in the game' longer. Once the final option is chosen, one has to face the reality of losing, and can no longer derive pleasure from anticipating what it would be like to win (Elster & Loewenstein, 1992). People might therefore prefer selecting an option in this situation because it allows them to enjoy the possibility of winning for longer. To illustrate, imagine a choice between a lottery ticket that is going to be played immediately, and one that will be played in a week. An expected value maximizer who discounts future outcomes would naturally take the immediate payoff ticket, but it is probable that most people will take the delayed one. Whether the "staying in the

game" explanation is applicable to all examples of the lure of choice is discussed in the next chapter (Sections 6.4.6i-iii).

5.3. *Studies 9a and 9b*

These studies replicated a study which suggested a directly opposing thesis to the lure of choice (Brenner et al., 1999). In two studies they investigated the ways in which the comparisons that decision makers make between options as a result of their groupings affect behaviour. They argued that grouping items together encourages within-group comparisons of options rather than between-group comparisons, and when the options being compared have both meaningful advantages and disadvantages, comparative loss aversion weighs more heavily and such comparisons damage the attractiveness of grouped items. This argument is hereafter referred to as the "comparisons-hurt" explanation.

The results of Brenner et al's (1999) second study in particular appear to be a direct contradiction of the lure of choice. A large number of students were asked to indicate their preferences in a number of decision problems (choices between restaurants, entrées, fast foods, videos, snacks, Saturday activities, drinks, gifts and desserts). Each problem consisted of four options, and each was presented in such a way that participants were asked to choose between a lone item and the remaining three grouped together. For example:

"Which of the following do you prefer?

Seafood restaurant

Your choice of either Italian, Mexican or Thai restaurant?"

If the grouped options were selected, participants were not required to indicate their preference between the options of that group. Every decision problem

was presented in four formats, with each option playing the part of the lone option once.

To measure the effect of grouping, Brenner et al. calculated the sum of the lone option choice share (the proportion of participants preferring the lone option) across the four formats for each decision problem. In other words, if all options were preferred equally, the sum of the four lone option choice shares should be: 25% + 25% + 25% +25% = 100%. If one option was greatly preferred, the lone option sum might be: 55% + 15% + 15% + 15% = 100%. Regardless of the actual distribution of preferences for individual items, if the grouping of the options has no effect, the sum of the lone option share would be approximately 100% for each decision problem. If the lone option is preferred to the group, this sum would be greater than 100%. If the group is preferred to the lone option the sum would be less than 100%.

Across the nine problems, the average sum of lone option choice share was 116%, significantly greater than 100% ($z = 3.61, p < .001$). The authors argued that this was due to comparative loss aversion arising from the increased number of intra-group comparisons for the grouped items compared with the lone item, which, at most, was compared to the "best" of the grouped items.

These results contrast the lure of choice. The lure of choice thesis would argue that the choice offered by the group is inherently attractive and would therefore predict that the sum of the lone option choice share to be less than 100%, indicating that individual options are more attractive when offered as part of a choice set than when offered in isolation.

To clarify this seeming contradiction, Brenner et al.'s (1999) study was replicated, with some modifications, in two exploratory studies, Study 9a and 9b. Study 9a had two conditions and used one of the decision problems used by Brenner et al. Condition 1 was a direct replication of Brenner et al.'s paradigm – the decision

problem had four items, and hence each lone option was offered alongside a grouping of three items. This served as a control condition and a comparisons-hurt prediction would be a lone option sum of more than 100%, specifically, in the region of 125% - the results for this decision problem in the original paper. However, if the choice afforded by the grouping is attractive, and lures participants, the lone option sum will be less than 100%. Hence:

H9$_i$ (basic comparisons-hurt hypothesis): lone option sum for control condition of Study 9a will be > 100%.

H9$_{ii}$ (basic lure of choice hypothesis): lone option sum for control condition of Study 9a will be < 100%.

Condition 2 was designed to test explicitly the explanation that the intra-group comparisons that occur in a grouping of items damage the attractiveness of those items. In Brenner et al.'s original work, these intra-group comparisons are assumed to occur, but here participants were required to make them directly. That is, before deciding between the lone item and the grouped items, participants were asked to compare directly the individual items within the grouping. If (assumed) comparisons hurt, then explicit comparisons should hurt even more, and the sum of the lone option share for this decision problem should be even greater than for the control condition 1. On the other hand, if the lure of choice effect operates, explicit comparisons before the decision should have no effect on the attractiveness of the grouped set, although the lure of choice would not make any specific predictions in respect of differences between the conditions in Study 9a.

H9$_{iii}$ (forced comparisons-hurt hypothesis): lone option sum for forced-comparisons condition of Study 9a will be > 100%, and greater than lone sum option for control condition of Study 9a.

H9$_{iv}$ (forced-comparisons lure of choice hypothesis): lone option sum for forced-comparisons condition of Study 9a will be < 100%.

Study 9b was designed to investigate a different aspect of this work. One difference between the comparisons-hurt study and the early lure of choice studies is the number of options on offer. The lure of choice studies reported thus far have usually had a total of three options (one lone item and a pair of items), whereas Brenner et al.'s study had four options (one lone option and a triplet of items). It may be the case, therefore, that the number of options in the grouped set is a critical difference. For this reason, Study 9b had two conditions, one with a choice set of *three items* (the standard lure of choice number – one lone item and a choice pair) and one with *five items* (one lone item and a grouping of four items).

A weak comparisons-hurt prediction would not differentiate between the two conditions of Study 9b, but would simply predict a sum of the lone option choice share greater than 100% for both conditions. A strong comparisons-hurt prediction would be that as the number of items in a choice set increases, so too does the number of likely damaging intra-group comparisons, and hence the lone option would be even more favoured in these conditions. Following this reasoning, a decision problem with five options would have a sum of lone option share not only greater than 100%, but greater than one with three options.

H9$_{v}$ (weak comparisons-hurt hypothesis): lone option sum for three-choice and five-choice conditions of Study 9b will be > 100%.

H9$_{vi}$ (strong comparisons-hurt hypothesis): lone option sum for five-choice condition of Study 9b will be > 100% and > lone option sum for five-choice condition of Study 9b.

A weak lure of choice prediction would not suggest a difference between the five and three item decision problem in terms of the lone option share. It would expect that the attraction of the choice offered by both the two and four-item choice sets would damage the lone option share equally. Consequently, the sum of the lone option shares would be lower than 100% in both cases. A strong lure of choice hypothesis would state that as the number of options in a group increases, so does its attractiveness (up to an unspecified ceiling number of options where choice perhaps becomes less attractive or indeed off-putting). Hence the lone option sum for a problem set of five items would not only be less than 100%, it would also be substantially less than for a problem set with three items.

H9$_{vii}$ (weak lure of choice hypothesis): lone option sum for three-choice and five-choice conditions of Study 9b will be < 100%.

H9$_{viii}$ (strong lure of choice hypothesis): lone option sum for five-choice condition of Study 9b will be < 100% and < lone option sum for three-choice condition of Study 9b.

The conditions of Study 9a and 9b and these predictions are summarised in Table 10. Study 9a used the four dessert choices used by Brenner et al. (1999): chocolate cake, icecream, cheesecake and fruit salad and Study 9b used the restaurant choices used by them (seafood, Mexican, Italian in the three-choice

condition, with Thai and Indian added for the five choice-condition). These two decision problems were selected as being most applicable to a UK participant pool, as many items in the other decision problems would have been unfamiliar (e.g., Taco Bell, Jack in the Box, Butterfinger, Hershey's Kisses and Gatorade). In addition, they were the conditions in the original study which had the greatest and third greatest lone option choice sum, hence being the most conservative way to test the lure of choice. Each participant answered two questions, one pertaining to restaurant choice and one relating to the choice of desserts. For roughly half the participants the dessert question was presented first, for the rest the restaurant question was presented first. In all, there were 16 versions of the experimental questionnaire (see Appendix I for examples of 8 versions, covering all experimental presentations).

Study, condition and pre-test forced comparisons	Lone option	Group	Lone option share sum predictions	
			CH	LoC
Study A: *Condition 1, Control*				
-	A	(B C D)		
-	B	(A C D)	123-	
-	C	(A B D)	125%	<100%
-	D	(A B C)		
Condition 2, Forced-comparisons				
Do you prefer B or C, C or D, B or D?	A	(B C D)		
Do you prefer A or C, A or D, C or D?	B	(A C D)		
Do you prefer A or B, B or D, A or D?	C	(A B D)	>125%	<100%
Do you prefer A or B, A or C, B or C?	D	(A B C)		
Study B: *Condition 1, three-choice*				
-	A	(B C)		
-	B	(A C)	? 100%	< 100%
-	C	(A B)		
Condition 2, five-choice				
-	A	(B C D E)		
-	B	(A C D E)		
-	C	(A B D E)	>>	<<100%
-	D	(A B C E)	100%	
-	E	(A B C D)		

Table 10. Structure and conditions of Studies 9a and 9b, with predicted outcomes. CH = comparisons-hurt, LOC = lure of choice. CH predictions based on Brenner et al., (1999) study 2.

Participants were 301 undergraduate students, not involved with any other study, who completed the task in class time (49% female, mean age 18.4 years).

5.3.1. Results and discussion of Study 9a and 9b

The results for Study 9a and 9b are presented in Table 11.

	Lone Choice Share					Total
Study 9a (n = 299)						
	Cheese-cake	*Ice Cream*	*Choc Cake*	*Fruit Salad*		
Control (n = 149)	19	27	26	22	-	**94**
Forced-comparisons (n = 150)	13	28	30	25	-	**96**
Study 9b (n = 301)						
	Italian	*Mexican*	*Thai*	*Seafood*	*Indian*	
Three-choice (n = 113)	38	22	33	-	-	**93**
Five-choice (n = 188)	31	17	14	11	16	**89**

Table 11. Results for Studies 9a and 9b. Numbers represent percentage participants selecting each option when it was presented as lone option. Total refers to lone option sum for each condition across all presentation formats, expressed as a total percentage.

As can be seen, there was a consistent pattern across all conditions in both studies. The total lone option choice share was less than 100% in each condition in both studies. In Study 9a, the weighted mean lone share for the four decision formats for the control condition was 23.49, significantly lower than the expected 25%[13] (t (148) = 5.72, $p < .001$) and for the forced-comparisons condition the weighted mean lone option share was 24.00, lower than the expected 25%, but not significantly

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[13] As only one decision problem was used to test these hypotheses, the mean lone share sum, as used was Brenner et al. (1999) could not be calculated, therefore the mean lone option share across decision formats was calculated and compared to 25%. The expected lone option share should be 25% for a choice problem with 4 items, regardless of the popularity of any individual item.

different (t (149) = -1.96, p = .052). This suggests that rather than being favoured when presented alone, as proposed by Brenner et al., an option that was presented alone was chosen less often than when it was presented with others in a group. This is contrary to the predictions of the comparisons-hurt explanation, *H9ᵢ*, supports *H9ᵢᵢ*, the *basic lure of choice hypothesis*, and provides weak evidence for *H9ᵢᵥ, the forced-comparisons lure of choice hypothesis*. In terms of the relative size of the effects, there was very little evidence that forcing people to compare options before deciding had any effect on whether they selected the lone option or the grouping. After forced comparisons, there was a slight increase in the number of people selecting the lone option, but this was not sufficient to raise the lone option sum to 100% or above, therefore offering no support for *H9ᵢᵢᵢ (forced comparisons-hurt hypothesis)*, in which we would have expected a much stronger effect than in the control condition.

In Study 9b, the weighted mean lone option sum for the three presentation formats in the three-choice condition was 30.97%, significantly different to the 33.33% that would be expected in a three-choice problem (t (112) = .3.70, *p* < .001). For the five-choice condition, the weighted mean lone option share for the five presentation formats was 18.09%, significantly different from the expected 20% (t (187) = -3.65, *p* < .001). Once more, we have support for the lure of choice hypotheses, specifically *H9ᵥᵢᵢ, the weak lure of choice hypothesis* for these conditions, and *H9ᵥ, weak comparisons-hurt hypothesis* can be rejected. In its strong form, the lure of choice predicted that choosing from a 4-item grouping would be more appealing, and therefore demonstrate a stronger lure effect, than a choosing from a 2 item set in Study 9b (*H9ᵥᵢᵢᵢ, strong lure of choice hypothesis*). There is evidence to support this. There was a reduction in the lone share sum in the five-choice condition compared to the three-choice condition from 93 to 89. The

comparisons-hurt hypothesis predicted the opposite effect (*H9$_{vb}$ strong comparisons-hurt hypothesis*), and hence was rejected.

In this case, the lure of choice predicted the results of Studies 9a and 9b better than the comparisons-hurt explanation. The important question is why these differences have occurred given that the studies reported here (in particular, the control condition of Study 9b) were close replications of the earlier study. One *post hoc* observation is that Brenner et al. (1999) used very large samples (n's ranging from 105 to 251). In the case of the desserts problem set (the only condition where a direct comparison can be made), n = 251 and in the corresponding condition in the study reported here, n = 149. It seems unlikely, however, that a difference in the sample sizes was responsible for the difference in results (i.e. a complete reversal).

Another difference is that the comparisons of the lone option share in Brenner et al.'s study were made between 100% and the mean lone option share across nine decision problems. As an exploratory study, Studies 9a and 9b used one decision problem each. However, it is again unlikely that the difference in these results is caused by that factor – all but one of the decision problems described by Brenner et al. showed a lone option share of 100% or over, whereas all four conditions reported here demonstrated a lone option share of less than 100%. In other words, a consistent pattern was demonstrated in both experiments, and there is no real reason to believe that more or less examples in either experiment would have yielded different findings.

It is difficult to say whether subtle differences in wording may have caused the dramatic differences in the studies' findings without precise details of the exact nature of the materials[14], but this could be an important factor. Sood et al. (2004)

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[14] The authors were contacted to ask for further details and to discuss the comparative findings of the studies but no response was received.

suggested that the way a preference is elicited does have an effect on whether the group or lone option is preferred. In a follow up to Brenner et al. (1999), they suggested that preference for choice can depend on whether the elicitation question focuses on the group choice set (e.g. the stores available) or on the individual items within it (e.g. the individual brands of soda available at each store). Sood et al. differentiated between what they call *direct* and *derived* preferences. A choice such as this one between two restaurants offering different dishes[15] evokes a direct comparison of restaurants, which "focus(es) on aspects of current choice alternatives that are not properties of any individual subsequent options" (i.e. the individual dishes on the menu). A direct preference elicitation is related to a group advantage, which is more likely when an option has a meaningful characterisation or coherent unit identity (as a type of restaurant). On the other hand, Brenner et al.'s studies required derived evaluations which "base evaluations of current alternatives on properties of the options available in subsequent choices" (Sood et al., page 17) which are more related to a group disadvantage.

The next study was related to this differentiation between direct and derived decision foci. In particular, one might speculate that participants' *interpretations of the subtle differences* in the experimental materials had an impact on their behaviour. Brenner et al. (1999) told participants that the experimenters had "*randomly grouped together* three of the options in each problem" (page 227), whereas the instructions given to the participants in these studies included "Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer?" followed by the two choices (lone option and grouping). It is possible that there were subtle differences in the perceived consequences of

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[15] Or the lone-alternative effect reported by Kahn et al. (1987) and Glazer et al. (1991), discussed in Chapter 2.

decisions made in the two studies, which could have been associated with differing psychological motivations of participants.

The Brenner et al. (1999) study may have engendered feelings that the preferences being asked for were context-free and wholly independent, one-off selections. This is especially likely as if a participant chose the grouping option, they were not asked which of the individual items they preferred and were asked a number of such questions in a row, without feedback. They perhaps therefore came to expect "quick-fire" questions with few consequences. On the other hand, the brief scenario that preceded the questions posed to participants in Studies 9a and 9b, which asked them to imagine that they were in a particular situation (choosing a meal or choosing a dessert) may have made some to believe that choosing the grouped set would have had later consequences (such as having at some point, to choose their favourite from among theses items).

It is possible to speculate *post hoc* that subtle difference in instructions engendered a different orientation in the participants, which could be classed as a more "active" orientation in the studies reported here, compared to the more "passive" orientation in the Brenner et al. (1999) studies. If this is the case, an active or passive orientation may have caused different psychological mechanisms to be triggered, accounting for the different behavioural observations. This possibility has some support from existing research evidence and is discussed in more detail in Chapter 6. For example, the work of Reeve et al. (2003) relating to self determination and choice discussed in Chapter 2 (Section 2.9.4) suggested that people are more likely to feel a sense of self-determination and greater intrinsic motivation in situations of action-choice than in those where less action is required. The final study reported here was designed to test the possibility that the

active/passive distinction was the critical difference between the original study and this replication.

5.4. Study 10

In the light of the previous discussion, Brenner et al.'s (1999) explicitly random grouping of options is referred to as passive choice. However, in many of the conditions used in the previously reported studies, the situations in which the lure of choice was demonstrated could be described as active choice (participants were asked to imagine themselves in realistic situations, e.g. "which part of town to go to for a nightclub?" "which bank to visit?" and which table to play a game at?") Furthermore, the only main difference between Studies 9a and 9b and the Brenner et al. study was a slight difference in wordings used to present the decision problems. The basic tenet behind Study 10 was that this difference changed the decision motivation from passive to active. A change in motivation may relate to a change in preference for choice. Study 10 replicates a number of the decision scenarios used by Brenner et al., presented in such a way that direct comparisons between passive and active choices could be made.

Study 10 had two conditions; the *passive condition* (participants were told that options were "randomly grouped" together, following the instructions used by Brenner et al. as closely as possible) and the *active condition*, which used brief scenarios to introduce each decision problem. Once more, each decision problem was presented in four formats, with each option playing the role of the lone option once.

H10ᵢ (passive decision hypothesis): when the options are grouped randomly, the comparisons-hurt explanation predicts a lone option sum for the passive condition to be > 100%.

H10ᵢᵢ (active decision hypothesis): when the options are described in terms of a brief scenario, the lure of choice explanation predicts a lone option sum for the active condition to be < 100%.

It is hypothesised that the comparisons-hurt explanation and the lure of choice explanation can work side by side because of the different intrinsic motivation of the participants, as determined by the experimental format. In the active condition, if people are more likely to imagine themselves actually making the decision for real, building on Reeve et al.'s (2003) argument, they are more likely to wish to operate with a greater level of self determination. Hence a course of action in which they are able to exercise further choice within the grouping would seem more attractive. In a situation where self determination is less salient (the passive condition), people are more likely to rely on internal cues to evaluate the options and therefore intra-group comparisons within the group would render the lone option more attractive.

In order that a more comprehensive test of the hypotheses could be made, each condition used four different decision problems, so that the mean lone option sum could be compared against the expected 100% sum (as in the original paper). As discussed before, not all nine original examples were relevant to a UK participant pool. The four selected were those considered most meaningful: restaurant: seafood, Mexican, Italian and Thai; main course: chicken, beef, fish and pasta; drink: fruit juice, tea, coffee and cola[16]; dessert: chocolate cake, ice cream, cheesecake and fruit salad.

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[16] Cola and coffee were substituted for Fruitopia and Gatorade in the original materials.

Each participant was randomly allocated to either the passive or active condition and received four decisions (drink, restaurant, main course and dessert). Each option within the choice set played the role of lone option once and the order of the items in the grouping was rotated. For half the participants the lone option was presented first and for the other half the grouping was presented first. Table 12 shows the items presented in each condition (see Appendix J for materials). Participants were 374 undergraduate students (55% female, mean age 18.8 years) who took part in class time and were not involved with any earlier experiments.

Version	Lone option	Group
Version 1	Fruit juice	(Cola, coffee, tea)
	Seafood	(Mexican, Italian, Thai)
	Chicken	(Beef, fish, pasta)
	Chocolate cake	(Ice-cream, cheesecake, fruit salad)
Version 3	Cola	(Coffee, tea, fruit juice)
	Mexican	(Italian, Thai, seafood)
	Beef	(Fish, pasta, chicken)
	Ice-cream	(Cheesecake, fruit salad, chocolate cake)
Version 5	Coffee	(Tea, fruit juice, cola)
	Italian	(Thai, seafood, Mexican)
	Fish	(Pasta, chicken, beef)
	Cheesecake	(Fruit salad, chocolate cake, ice-cream)
Version 7	Tea	(Fruit juice, cola, coffee)
	Thai	(Seafood, Mexican, Italian)
	Pasta	(Chicken, beef, fish)
	Fruit salad	(Chocolate cake, ice-cream, cheesecake)

Table 12. Option choices for Study 10. Each version was presented in either the active or passive condition, as determined by the instructions given to participants. For versions 1, 3, 5 and 7 of each condition the lone option was presented first, for corresponding versions 2, 4, 6 and 8 the grouped items were presented first.

5.4.1. Results and discussion of Study 10

The lone option sums and the mean lone option sum for the four decision problems in each condition are shown in Table 13.

Condition	Lone option share				Sum
Passive choice (N = 188)	*Fruit juice* 64	*Cola* 28	*Coffee* 16	*Tea* 29	137
	Seafood 11	*Mexican* 22	*Italian* 60	*Thai* 20	112
	Chicken 49	*Beef* 30	*Fish* 9	*Pasta* 31	119
	Choc cake 45	*Ice Cream* 28	*Cheese cake* 31	*Fruit Salad* 24	128
				Mean sum of lone option	**124**
Active choice (N = 186)	*Fruit juice* 37	*Cola* 15	*Coffee* 15	*Tea* 19	86
	Seafood 7	*Mexican* 19	*Italian* 54	*Thai* 19	99
	Chicken 39	*Beef* 28	*Fish* 6	*Pasta* 30	103
	Choc cake 37	*Ice Cream* 28	*Cheesecake* 24	*Fruit Salad* 8	97
				Mean sum of lone option	**96**

Table 13. Results for Study 10. Figures represent percentage of participants selecting each option when it was presented as the lone option.

It can be seen that, in line with Brenner et al.'s (1999) original findings, in the passive condition, an option was more attractive when it was presented as a lone option than when it was presented as a member of a three-item group. For all four decision problems, the sum the lone-sum option across the four decision formats (124%) was significantly greater than the 100% one would expect if presentation had no effect, (t $_{(187)}$ = 36.25, p < .001). This is evidence for *H10$_i$, the passive decision comparisons-hurt hypothesis.*

To turn the active choice condition: as *H10$_{ii}$, the active decision hypothesis* predicted, when the options were described in terms of a brief scenario, the mean lone option sum for the active condition was less than 100% (96%). This was significantly different from 100% (t $_{(185)}$ = -7.87, p <.001). Furthermore, as one would expect, comparing the mean lone option sum across conditions, a significant

difference was observed ($F_{(1, 376)}$ = 2509.07, p < .001, r^2 = 8.70), suggesting that the instructions given to participants had an effect on their behaviour.

These results offer evidence for the different possible psychological effects at work, depending on whether the decision is considered active or passive. However, the lone option sum for the active condition was close to 100%, and warrants further discussion. Of the four observations, three (restaurant, main course and dessert) were very close to 100% (99, 103 and 97), and it was probably due to the lone option sum for the drink problem (86) that the overall mean lone option sum was significantly less than 100%.

However, with hindsight, there may have been possible ceiling and floor effects in operation. The options selected were predominately the same as those used by Brenner et al., but in this sample, it appears that some of the options were universally unpopular (regardless of condition). For example, only 11% and 7% of participants selected the seafood option as the restaurant choice in the passive and active conditions respectively. On the other hand, the Italian restaurant was selected by 60% and 54% in the two conditions. Furthermore, when it came to selecting main courses, only 9% and 6% chose fish in the passive and active conditions respectively. Although the logic of the analysis suggests that underlying base rates should not fundamentally impact on the lone option sum (if an individual option is preferred by 90% of participants *per se*, it should be preferred by 90% of participants whether presented as a lone option or within a group), it would have been preferable to have used options that had been pre-tested to have been roughly equivalent in attractiveness in a direct choice[17]. It appears that the young undergraduate

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[17] Equivalent comparisons cannot be made with Brenner et al.'s (1999) participants' preferences as individual cell contents were not provided in the paper.

population tested here did not care much for seafood and fruit salad, preferring chicken, pasta and chocolate cake.

This observation may be related work on the differential impact of single versus joint evaluation of options (Hsee & Leclerc, 1998). If options are already attractive in separate evaluation, then subjecting them to joint evaluations will hurt their attractiveness. If the focal options are unattractive in separate evaluation, subjecting to joint evaluation will enhance their attractiveness. However, it is difficult to say how much of an impact underlying preferences actually did have, as these options were not evaluated separately (other than in comparison with the grouped items).

Retrospectively, another important issue might account for the smaller lure of choice than expected. In the active condition, as described, a short scenario introduced each situation. Two observations can be made about this. First, the description was very brief, and could have been more effective at getting the participants to envisage themselves in such as situation (that is to get them to feel as close to making an "active" decision as possible). An alternative might have been to have either asked people to make real decisions (for example between small, fast-moving consumable goods) or to engage them in some real visualisation techniques.

Secondly, the order of the presentation of the items to participants was kept constant in order to be more logical to participants (they chose a restaurant, followed by main course, followed by dessert). This may have inadvertently led to some experimental artefacts. For example, by selecting a particular restaurant, say a seafood restaurant, you are limiting the range of options that it would make sense to select as a main course; you are unlikely to choose beef as main course having just selected a seafood restaurant. Likewise, fish is probably not considered a typical Mexican dish. Although this may have had some mild confounding effects, the

options with which this would have had the most impact (seafood and Mexican restaurant) were the least popular and hence any follow-on effects would have been minimal.

Taken together, however, these two post hoc observations suggest the study provides a rather conservative test of the lure of choice, and therefore *its modest demonstration in the active choice condition should be regarded as all the more convincing.*

5.5. *Summary and discussions of Studies 8, 9a, 9b and 10*

The studies reported in this chapter move beyond straight-forward demonstrations of the lure of choice in simplistic conditions, and show them in contexts which have been previously examined in detail by other researchers. In all cases, namely a version of the Monty Hall problem, and a replication of a previously published study by Brenner et al. (1999), the lure of choice occurred consistently and was demonstrated in every condition in which it was predicted (although the magnitude of the effect was not always predicted).

Study 8 demonstrated that the lure of choice is strong enough to overcome a well-documented resistance to switch the initially chosen option in a version of the Monty Hall problem. This study also demonstrated that the lure of choice is not restricted to hypothetical gambles or contrived scenarios.

The motivation for Studies 9a, 9b and 10 was a study previously published by Brenner and his colleagues (1999) which found results inconsistent with the lure of choice. Studies 9a and 9b constituted a short replication of the study, along with some particular manipulations that were designed to test aspects of the lure of choice explanation and the authors' competing explanation, the comparisons-hurt hypothesis. In all cases, the lure of choice explanation had more support than its

rival. A possible reason that reconciles the differences in such empirical studies was addressed explicitly in Study 10. There appears to be evidence to suggest that the lure of choice is more likely in decision situations which can be construed as active, compared with those which are more passive in nature. This active/passive distinction has been discussed in the literature on intrinsic motivation and self-determination (see Section 2.9.4) and may well have implications for much behavioural decision research on choice. This idea is discussed more fully and developed in the next chapter.

The next and final chapter draws together the various illustrations of the lure of choice reported in Chapters 3, 4 and 5, and demonstrates how these fit with existing related bodies of literature in order to answer the research questions posed at the start of the thesis. The chapter contains discussion of the possible psychological mechanisms the lie behind the lure of choice, including explanations that have been ruled out and those that appear promising and warrant further investigation. In particular, as first suggested in Chapter 4, the notion is put forward that the intrinsic motivation to follow choice-rich paths is determined, at least in part, by a decision heuristic that has developed over generations, because this strategy has proved developmentally and evolutionarily advantageous.

Chapter 6. Discussion and conclusions

"The strongest principle of growth lies in human choice," George Eliot (1819 - 1880).

6.1. Introduction

The main contributions of this work are expanded in this chapter. It is organised in the following way. After a brief introduction, Sections 6.2 and 6.3 provide a summary of the studies reported in the previous three empirical chapters, in particular detailing the conditions under which the lure of choice was demonstrated and those in which it was not. Next, Section 6.4 revisits the research questions presented in Chapter 1, collecting together the relevant evidence applicable to each. The chapter then goes on to discuss a number of different possible causes of the lure of choice, drawing on both empirical work reported here and the research evidence from behavioural decision research, animal research and consumer decision making that was introduced and discussed in Chapter 2.

Through an evaluation of both new and existing evidence, two main arguments are developed in Sections 6.5 and 6.6: first, the lure of choice stems from an evolutionary advantageous decision heuristic that proved functional in the past, but that which in the world in which we live now, governed largely by marketers, is less beneficial and can in fact sometimes be detrimental to the decisions we make; second, there may be specific conditions under which behaviour based on this decision heuristic is observed.

Next, Section 6.6 discusses how, taken together, these two arguments can help explain some of the contradictions and controversies that exist in the decision making literature. In the light of this discussion, the implications of the work for

marketing, business and policy are outlined in Section 6.7. Section 6.8 indicates how this approach could help inform a research agenda for the future and maps out a number of possible research avenues. Section 6.9 addresses methodological issues concerning the work, in particular outlining what has been learnt about the research process during the course of this work. Finally, Section 6.10 offers some concluding comments.

A primary aim was to investigate the impact of increased choice on human decision making, during the course of which, the lure of choice, a new context effect in the field of behavioural decision theory was identified (Bown et al., 2003). The idea that the options available might fundamentally alter the decisions people make is not new, but this particular phenomenon has not been demonstrated before.

The extensive empirical work amassed provides a coherent body of work that has developed logically, yet responsively with respect to developments in the field (notably Brenner et al., 1999; Hutchinson, 2005; Iyengar & Lepper, 2000; Sood et al., 2004). At a methodological level it has examined the influence of choice on decision behaviour using experimental designs not used before (particularly in the first seven studies). The value of the empirical work is twofold – firstly, the results go a long way to answer the research questions posed at the start of the thesis and add to our understanding of choice in decision making, and secondly, the methodologies employed might be usefully applied in other areas of decision research.

The contribution at a theoretical level adds to our knowledge of human decision making and the proposed explanations for the lure of choice may also help reconcile some theoretical discrepancies between existing approaches in the field. Lastly, in practical terms the lure of choice has implications for other areas that require an understanding of human decision making, for example consumer decision

making and marketing, and has the potential to contribute to business and social policy. Ultimately, this work can help guide the way future research is developed, and has already had an impact in the field (the first article published based on this research, Bown et al., 2003, has received 5 citations in published work. Source: Social Science Citation Index, December 2006).

6.2. Summary of the studies

The goal of the first set of studies was to demonstrate whether the presence of choice had any effect on the decisions people made. Having demonstrated that it did, the focus then shifted to examine how and why it had the effect it did. Whilst addressing these questions, a number of different experimental approaches were used in ten studies, in various contexts with over 2,400 participants.

6.2.1. Initial demonstrations of the lure of choice

A set of exploratory phenomena-led studies in four two-stage gamble experiments examined people's preferences for a sure thing at Stage 1 compared with their willingness to gamble to reach either one target option, or their choice of options at Stage 1 (target or lure). The studies demonstrated that when people were offered the chance to choose an option at Stage 2, they were much more likely to risk gambling at Stage 1 to reach that decision point. More importantly, people demonstrated these risk seeking preferences even when the additional choice option was worse than either the sure thing at Stage 1 or the gamble at Stage 2 common in both the choice and no choice experimental conditions. This increase in the likelihood of choosing a particular option when presented in a choice pair with an inferior option illustrates the lure of choice.

6.2.2. The lure of choice in relation to other context effects

The second set of studies developed this theme further. Results from the first set of studies suggested that the presence of an additional choice item fundamentally changed the preference for the other items available. These findings could have been attributable to the asymmetric dominance effect (Huber et al., 1982). Therefore the second set of studies investigated the relationship between the lure of choice and the asymmetric dominance effect. These studies employed a "floating lure design," in three realistic, yet controllable scenarios, in which the lure option was paired with one of two equally preferred target alternatives in two conditions. In nearly every condition, it was found that participants preferred the target option that was paired with the lure and rarely chose the lure itself. This finding runs contrary to the asymmetric dominance effect explanation, which would have predicted a preference for the dominating target, regardless of which target the lure was paired with. The convincing results suggest that the main effect observed in this set of studies was the lure of choice rather than the asymmetric dominance effect. Whereas the asymmetric dominance effect is determined by the relationships between the various options in terms of their values on two descriptive dimensions, the lure of choice operates on the basis of specific pairings of options together in choice sets - the increased choice offered by the set is the alluring feature. The floating lure studies demonstrate that although related to context effects such as the asymmetric dominance and compromise effects, the lure of choice is an independently operating consequence of choice.

6.2.3. Following up the lure of choice

The third set of studies developed the work in two ways. First, they demonstrated the lure of choice in domains very different to the preceding decision

situations. Second, they develop the idea that the lure of choice is a result of a decision heuristic based on the principle that it is better to choose from a larger set of options than a smaller one.

In Study 8, a variant of the classic the Monty Hall problem, it was found that offering people the chance to switch from their initially selected door to their *choice* of one of the remaining doors was motivation enough for them to overcome the usually strong reluctance to switch after an initial commitment to a door.

Likewise, Studies 9a, 9b and Study 10 demonstrated the lure of choice in situations very different to earlier examples, demonstrating the far reaching breadth of the lure of choice. Study 10 tested the observation from the preceding studies and extant literature regarding the possible decisional implications of the differences between active and passive choice motivations. In this study the lure of choice occurred more frequently where there was an "active" orientation towards the decision than when the decision was more "passive". Specifically, Study 10 tested whether the comparisons-hurt explanation of a lone item advantage (Brenner et al., 1999) could be reconciled with the predictions of the lure of choice. In two identical decisions, which varied only in terms of the instructions given to participants there was a marked difference in the behaviour of respondents. Those who were asked simply to express a preference for a lone item or a randomly grouped set (a passive choice), showed a preference for the lone item, as predicted by the comparisons-hurt explanation. Those instructed to imagine themselves actively making the decisions showed much less of a preference for the lone item and favoured the grouped set, as predicted by the lure of choice.

This study gives an indication of one of the possible mechanisms behind the lure of choice. If the lure of choice is based on a decision heuristic that has developed because it is usually better to choose from a larger set than a smaller one,

it makes sense that this effect is stronger in situations of active choice, since these are more closely related to the decisions faced in the real world. This proposition is discussed more fully in Section 6.5.

6.3. When and where did the lure of choice occur?

Appendix K provides a summary of all the thesis' hypotheses and indicates which were accepted or rejected. There is clear evidence that the lure of choice is a robust effect. However, a more fine-grained review of results is required to reveal whether the effect was consistently strong in all contexts. This section addresses the question of exactly where the lure of choice was demonstrated in the current set of empirical studies, and where the effect did not occur, or was less strong.

The majority of lures in these studies were asymmetrically dominated by the relevant targets (L1, L2d, L3d, L4hc, L4lc and L5: see Table 14 for key). A further three lures were conflicting with both targets (or target and sure thing), namely L2c, L3c and L6, and were also compromise lures (representing a mid point between $Target_1$ and $Target_2$). Lastly, L7c was conflicting with both targets, and L7d was symmetrically dominated (i.e. was dominated by both targets). The lure of choice was demonstrated with nearly all possible relationships between the lure and the target options. This demonstrates that the lure of choice operates under a range of conditions. However, it is also important to consider of the size of the effects observed.

	Condition / manipulation		Critical statistics	Effect size	Selecting lure (%)
Two stage gamble studies					
1	Dominated lure	L1	$\chi^2(1) = 5.43$, $p < .05\dagger$	Cramer's V = .21*	5
2	Dominated lure	L2d	$\chi^2(1) = 6.91$, $p < .01$	Cramer's V = .27*	0
2	Conflicted lure	L2c	$\chi^2(1) = 4.68$, $p < .05\dagger$	Cramer's V = .22*	9
3	Dominated lure	L3d	$\chi^2(1) = 13.06$, $p < .001\dagger$	Cramer's V = .37**	4
3	Conflicted lure	L3c	$\chi^2(1) = 8.72$, $p < .01\dagger$	Cramer's V = .32**	25
4	High contrast dominated lure	L4hc	$\chi^2(1) = 4.85$, $p < .05$	Cramer's V = .20*	0
4	Low contrast dominated lure	L4lc	$\chi^2(1) = 6.28$, $p < .05\dagger$	Cramer's V = .23*	2
4	Three choice condition (2 lures)	L4hc, L4lc	$\chi^2(1) = 2.71$, $p = .1$	-	0
Floating lure studies					
5	Asymmetrically dominated lure	L5	$\chi^2(1) = 4.42$, $p < .05\dagger$	Cramer's V = .18*	11^
6	Conflicted lure	L6	$\chi^2(1) = 4.93$, $p < .05\dagger$	Cramer's V = .24*	15^
7	Symmetrically dominated lure	L7d	$\chi^2(1) = 1.56$, $p = .46$, n.s.$\dagger$	-	3^
7	Conflicted lure	L7c	$\chi^2(1) = 7.45$, $p < .01\dagger$	Cramer's V = .24*	17^
Follow up studies					
8	Monty Hall choose-a-choice	-	$\chi^2(1) = 12.93$, $p < .001$	Cramer's V = .24*	n.a.
9a	Control	-	$t(148) = 5.72$, $p < .001$	-	n.a.
9a	Forced comparisons	-	$t(149) = -1.96$, $p = .052$	-	n.a.
9b	Three choice	-	$t(112) = .3.70$, $p < .001$	-	n.a.
9b	Five choice	-	$t(187) = -3.65$, $p < .001$	-	n.a.
10	Active versus passive instructions	-	$F_{(1, 376)} = 2509.07$, $p < .001$	$r^2 = 8.70$	n.a.

Table 14. Summary of results and critical statistics for all studies.
$\dagger$ indicates *third way analysis* (excluding those selecting lure)
^ indicates proportion across whole sample (both presentations in floating lure design)
* low to moderate effect size, ** moderate to substantial effect size (de Vaus, 2002)

The top part of Table 14 describes of each of the lure conditions depicted in Studies 1 to 7. There were only two situations where the lure of choice did not occur: first, L7d, the only symmetrically dominated lure. This is perhaps surprising, as one would expect the asymmetric dominance effect to be less strong in a situation where one target is not clearly superior in relation to the lure, hence allowing the lure of choice to prevail. The second situation where the lure of choice did not occur was in the three-choice condition of Study 4, when two lures and the target were available. This may be because the presence of two dominated lures made their inferior relationship with target$_L$ too transparent, and hence participants were less prone to the lure of choice.

Other than these two non significant results, Table 14 demonstrates the consistent nature of the lure of choice, which was significant in the other ten conditions. The effect sizes of the significant results were also remarkably similar across conditions, with relevant Cramer's V ranging from .18 (small) to .37 (moderate), with the majority being in the range .20 to .27 (low to moderate, according to de Vaus, 2002). There is little to suggest that in this set of studies that one particular type of lure has a stronger effect than another. Taken together, these results offer evidence that the lure of choice is a relatively modest, but consistent effect.

6.4. Research questions revisited

Another useful way of combining the findings from this range of experimental studies is to work through the research questions first presented in Chapter 1, organising and assessing the evidence relating to each one. In general, reflecting how this work has developed over time, the earlier studies address the first

few research questions and later studies focus on the later ones. As some of the earlier research questions have already been addressed in the summary of results in Sections 6.2 and 6.3, the discussion of these has been kept brief.

6.4.1. Research question i: Does the presence of choice lead people to act in a way they would not otherwise have done?

Overwhelming, according to the evidence from these studies, the answer to this fundamental research question is yes - choice was undoubtedly related to behaviour that was not demonstrated in the absence of choice. Specifically, in studies where it is possible to compare behaviour under choice conditions and those where people were not offered so much choice, there are clear differences in the options that people finally chose. In Studies 1, 2, 3 and 4 nearly all analyses which did not take into consideration those who selected the lure options (the third way analyses) indicated clear preference reversals between choice and no choice conditions. When people were offered no choice at Stage 2 they were far more likely to opt for a sure thing at Stage 1 than to gamble for a riskier option. When accompanied by a choice at Stage 2 however, their decisions at Stage 1 were far more likely to be to opt for the riskier gamble. Furthermore, in Study 8, the Monty Hall study, in a direct comparison people's behaviour was markedly different when offered choice than when offered a restricted choice. Thus, the evidence from these studies clearly suggest that behaviour is affected by the presence or absence of an element of choice.

6.4.2. Research question ii: Are people attracted to options that allow them the opportunity to choose from a number of options?

Developing the simple answer for research question i, this question addresses specifically how people behave when offered choice. In all studies where significant differences occurred between conditions, they were always in a direction that reflects a preference for choice. Specifically, in the 2 Stage gambles of Studies 1-4, the preference reversals witnessed indicate that people were attracted to Stage 2 far more frequently when there were two options to choose from than when there was only one. In Studies 5-7, people were significantly more likely to choose a course of action (directing a taxi to a certain part of town, going to particular bank or choosing a table at which to play a game) when that particular route offered them further choice between options, as opposed to no choice. Study 8 also offered evidence to suggest that people were more willing to change a commitment when the alternative offered choice, but were not willing to do so when the alternative did not afford them future choice. Finally, in Studies 9a, 9b and 10, people generally preferred items when they were offered as a group than when they were offered as a lone item. Overall, the results from these studies demonstrate that people generally act in a way that clearly reflects an attraction to choice.

6.4.3. Research question iii: If people are attracted to choice, is the effect strong enough to lead them to make sub-optimal decisions?

Having concluded that under many circumstances people are attracted to choice, this question addresses whether the effect can result in poorer decisions than the ones they would have or could have made. There are two types of evidence from these studies that address this question. Firstly, in the initial set of studies, specifically Studies 3 and 4, people forewent a better sure thing (compared with the

target and lure in terms of expected value) in order to pursue a course of action that offers them further choice between options. Although this comparison is based on objective superiority rather than subjective preferences, the fact that preference reversals were witnessed suggest that there had also been a revaluation (or possible masking) of subjective valuations. This was presumably caused by the additional choice, the only feature that differed between the conditions.

The second main piece of evidence to suggest that the lure of choice is strong enough to lead people to make poorer decisions is the number of people who actually chose the sub-optimal lures. As indicated in Table 14, this occurred in the conflicted lure condition of Study 3 (25% of participants in this condition selected the lure), the conflicted lure condition of Study 7 (17%), the conflicted lure condition of Study 6 (15.00%) and to lesser extents in the conflicted lure condition of Study 2 (9%) and the asymmetrically dominated lure condition of Study 5 (11%). The majority of these occurred when the lure was in conflict with the relative target(s), and hence the tradeoffs required were more complex. This may reflect participants' inability to make the required tradeoffs, but might also reflect those who had been lured by choice and once finding themselves having forgone their preferred option (either the sure thing or the $target_1$), they selected either at random or what they considered "the next best thing".

Taken together, these two observations show some modest evidence that the presence of additional choice is related to a tendency to select suboptimal outcomes.

6.4.4. Research question iv: If people are attracted to choice, are there particular kinds of choice that are more attractive than others?

The evidence relating to this research question is limited because the different choices available to participants in these studies were restricted. The main types of

choices that were offered were between targets and either dominated or conflicted lures. Study 2 hypothesised that conflicted lures would demonstrate a stronger lure of choice than dominated lures because the relative superiority of the target was more obscure. Although conflicted lures were more likely to be selected than dominated lures (as discussed in relation to the previous research question), their presence was *not* related to a stronger preference reversal than dominated lures. Likewise, in Study 3 there was no significant difference between the conflicted and dominated lure conditions. These observations suggest that, in line with arguments developed in Chapters 4 and 5 (and revisited in Section 6.5 below), the lure of choice has less to do with the explicit relationships between the options on descriptive dimensions (or type of decision) and more to do with the availability of choice *per se*.

6.4.5. Research question v: If people are attracted to choice, is there a point at which too much choice is unattractive, and people are detracted from it?

Related to the previous question, a critical aspect of choice is the size of the choice set. Previous work with much larger choice sets (e.g. Iyengar & Lepper, 2000) described a choice–overload effect, i.e. too much choice was demotivating and Desmeules (2002) suggested an inverted U shape function for the relationship between the extent of choice and the positiveness of the experience. Early hypotheses in this thesis suggested that if increased choice is considered good then within reason, greater choice should be considered even better (see for example, the three choice condition of Study 4). Even though the increase in the number of choices was minimal (the choice set increased from two items to three), no lure of choice was demonstrated in the three choice condition (whereas it had been in the corresponding two choice conditions). However, it is important to note that in this condition, two of the choice set were (clearly inferior) dominated lures. Therefore,

failure to observe the lure of choice was not necessarily related to too much choice being unattractive, but could have been because (as mentioned in Section 6.3) the inadequacy of the lures was more transparent (amplified by the fact there were two lures). If that was the case, the choice set may not have been considered to be a viable choice at all.

Study 9b addressed this question directly. Using options that were not inferior or superior to each other, it specifically investigated whether a choice set of two items was more likely to demonstrate the lure of choice than one which contained four items. It was predicted that items (restaurants) in a group of four would be preferred over items presented in a group of two. The larger grouping was preferred to the smaller one. To apply this finding to the research question at hand, if there is a point at which too much choice is unattractive to people, it was not found in these studies.

6.4.6. Research question vi: *What are the possible underlying causes of the lure of choice?*

After the initial demonstrations of the lure of choice, the early studies sought to clarify possible causes of the lure of choice. In particular, Study 4 manipulated decisions in such a way that if people were choosing as if they could have all the available options, it would be reflected in a stronger lure of choice effect. This was not the case, and therefore it was possible to rule out inappropriate summing of options as a possible cause for the lure of choice. Chapter 4 was devoted to testing whether the lure of choice is caused by the same mechanisms as the asymmetric dominance effect. The use of a floating lure design demonstrated that the lure of choice was predicted and demonstrated in conditions where an asymmetric

dominance explanation would have predicted a different result. Hence, the asymmetric dominance effect was also ruled out as a cause of the lure of choice.

A consideration of the cumulative results of all studies identify a number of possible factors, not necessarily mutually exclusive, which might lead to the lure of choice. This section addresses each in turn.

6.4.6.i. Deferring commitment and cognitive effort

First, the lure of choice may reflect a general desire to defer ultimate commitment for as long as possible. This may be related to the phenomenon previously discussed by Bastardi and Shafir (1998; Shafir et al., 1993) and introduced in Chapter 2 (Section 2.6.4), in which people prefer to continue searching for information beyond the point where new information is valuable. For instance, to use one of Bastardi and Shafir's examples, a student deciding whether to take a course might wait to find out whether the professor has a good or bad reputation, even when the knowledge is irrelevant to his or her decision. Bastardi and Shafir's studies suggest that people often put off making a commitment until all possible information is available, even when the information is useless. Deferring a decision can have negative consequence, not least being the possibility that opportunities will be lost as time passes. Bastardi and Shafir (1998) suggested that people can often be drawn by new information into making choices that they otherwise would not, and should not, have made, for example, learning that a professor has a bad reputation may make a student not take a course that is vital to his or her degree. It appears from their work that people do not assess options thoroughly, and use the useless information that they seek to shape their preferences. The evidence from the decisions investigated in this thesis suggests that following a path that offers greater

choice gives people another way to defer making a final and irrevocable commitment, albeit even for a short time[18].

Deferring commitment also means deferring cognitive effort. It may be easier to choose an option that leads to a further decision than to give full consideration to all the options in advance. Payne et al. (1993) have emphasised the role of minimising the cognitive effort involved in decision making, and have argued that, all things being equal, an easier-to-implement procedure will usually be chosen over a more taxing one. One way to simplify decision making is to conduct only a superficial examination of available options, and choose based on a heuristic rule such as 'it is better to choose from a larger than a smaller selection.' For instance, an easy way to choose a cinema is to choose the one with the most screens, without bothering to consider what is actually showing on those screens. Such a mechanism may account for why a relatively high number of participants in Studies 2, 3, 5, 6 and 7 selected the lure item. This result suggests that people did not think through every option before making their decisions, but first made the very simple decision of choosing on the basis of the presence or absence of choice. Only after they have taken the choice path did they give in-depth examination to the options that were then available. This suggests that decision making can be driven by a preference for choice *qua choice* and not by the options on offer.

6.4.6.ii. Keeping options open

The lure of choice might reflect the desire to keep options open. Individuals may prefer a lager set of alternatives to a small one in order to retain as much

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[18] It does not eliminate all commitment, of course, since following a route to greater choice (in these experiments) did mean the loss of desirable outcomes that were not part of the choice set (the sure thing or target₁ in Studies 1-7 or the lone option in Studies 9a, 9b and 10).

flexibility as possible at the very moment of deciding (Billot & Thisse, 1999; Koopmans, 1964; Kreps, 1979; Peleg & Menahem, 1973; Strotz, 1955). This may of course be related to the first cause (deferring commitment and cognitive effort), but the similarity would depend on the person's motivation. Deferring commitment is more related to gathering irrelevant information (the pursuit of useless information) whereas keeping options open may reflect an explicit (and possibly advantageous) decision strategy.

In many circumstances consumers are unsure about their future preferences (Kahn & Lehmann, 1991) and it makes sense to retain flexibility. However, in other situations this desire for flexibility is unfounded. Gilbert and Ebert (2002) found that people preferred changeable outcomes (those that they could either escape or reverse) to unchangeable outcomes, despite the fact that they were overall more satisfied with the latter. In their studies, photography students were asked to relinquish a photograph – some could change their minds while others made unchangeable decisions. Participants did not expect the changeability of the selection to have any influence on their liking of the picture, but those that made unchangeable decisions were actually more satisfied and liked their prints more. Likewise, Botti and Iyengar (2004) found that consumers preferred to choose even when items were not desired and ended up less satisfied with the decision outcome than people who did not choose. This lack of self awareness in terms of personal preferences and anticipated satisfaction might explain why some people in these studies opted for the choice route (in order to keep options open) but ended up with a poorer option.

6.4.6.iii. Prolonging the fun

Thirdly, in certain circumstances, the lure of choice might reflect a desire to stay "in the game" a little longer. In some of the studies presented here, particularly those that were introduced as games (Studies 1, 2, 3, 4, 7 and 8) there might have been a motivation to prolong the "enjoyment" as long as possible. Chapter 4 discusses the added utility that some people derive from a delay in resolving a decision problem or receiving a choice outcome (an obvious example being the anticipation of a weekly lottery over the immediate gratification of a scratch card). The pleasure from a (non-winning) weekly lottery ticket is eliminated once the numbers are drawn. The pleasure of anticipation and of exploring future possibilities is illustrated in other ways, such as the old adage that "it is better to travel in hope than to arrive." Other examples include the preparations for major festivals such as Christmas (where many people enjoy the preparations only to find the actual event comparatively disappointing) or spending time considering and discussing options on restaurant menus. If the participants in these studies (predominately students taking part in class time) considered the experiments to be frivolous and fun, this explanation is a possibility.

6.4.6. iv. Self determination

As discussed in Section 2.9.5, there is a relationship between perceived choice and the subjective experience of being fully autonomous in one's actions. According to the work of Reeve et al. (2003), Cordova and Lepper (1996) and Thomas and Oldfather (1997), the intrinsic motivation and appeal of self determination are related not simply to perceived choice of alternatives, but also to action choice rather than simple option choice. One way of interpreting this relationship is that that a decision that allows one to decide on a course of action for

one's self from a range of actions is likely to be more appealing than either a course of action with no element of self-determined choice, or a decision requiring passive judgments of options. This argument is developed further in Section 6.5 below.

6.5. The lure of choice as a decision heuristic

The sections above discuss four different reasons why people's motivation might be towards a choice-oriented route rather than one that offers no choice. There may be additional motivations, but these all point towards the strong possibility that in these situations people use the principle "it is better to choose from a larger set than a smaller one." Put simply, the lure of choice results from the use of a decision heuristic.

Sections 2.6.3 and 4.7 discussed the emergent value explanation of the asymmetric dominance effect (Pettibone & Wedell, 2000; Wedell & Pettibone, 1996), whereby people use heuristic-based evaluations of options to help them choose (such as basing judgments of an option on their domination of other options which makes them easier to justify). In the same way, choosing on the basis of an item's ability to keep one's options open could be seen as an emergent value which adds extra subjective value to that option. It is argued below that this preference for choice heuristic has arisen as part of our evolutionary heritage.

Our ancestors would have quickly learned that it is better to hunt in an area where there is a choice of prey (both in number and species) than in an area where there is little if any choice. Indeed, it is likely that they would not have had to learn at all – the research showing that animals prefer choice over no-choice paths introduced in Section 2.8 (Catania, 1975, 1980; Catania & Sagvolden, 1980; Ono, 2000; Suzuki, 1999; Voss & Homzie, 1970), suggests that the preference for choice may be a fundamental part of our natural endowment. It is difficult to think of a

natural environment in which there would be a zero, or even negative, correlation between choice and the value of the ultimate outcome. The evolutionary environment in which our preferences were developed would have rewarded following the lure of choice with an increased probability of survival and reproduction[19].

However, we live in a world in which natural selection plays a less important role in our survival, or at least the issues around which natural selection operate may have changed. We will not perish if we choose an inferior brand of cereal from the supermarket. Many of the decisions we face as humans are relatively trivial, and yet it is quite possible that we use some of the same heuristics that proved successful in our species' history. It will be the circumstances of the decision that determine whether the preference for choice heuristic is an inappropriate strategy or not. The problem occurs if people are not sensitive enough to the decision context.

As mentioned in Chapter 2 and Chapter 5 some authors (Cordova & Lepper, 1996; Reeve et al., 2003) have argued that an increase in simple *option* choice is not linked to increased intrinsic motivation, but *action* choice is (i.e. actually being able choose one's behaviour). This links with the evolutionary advantage of choosing a path that leads to choice just noted. Increased options for *behaviour* rather than options *per se*, seem far more likely to be evolutionarily advantageous. For example, simply having a number of escape routes available is not enough - you need to actually use that choice. Likewise, unless you are going to mate with a member of the opposite gender, there is little advantage in having a large lek available to you.

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[19] There is also some mixed evidence from the animal world. Hutchinson (2005) suggests that it if *too* much choice overwhelms and leads to worse item being selected, it could be adaptive to avoid choice and wait for an easier decision involving fewer options.

The results of Study 10 show that people *can be* responsive to the context of a decision. When asked to simply evaluate options, grouping (specifically intra-group comparisons) damaged the value attached to those individual items. On the other hand, when asked to imagine *acting* on those groupings/lone option arrangements, people preferred the choice offered by the group. This suggests that in this case, people recognised that the group allowed them to keep their options as open as possible, presumably until the point at which they would have had to make a final decision.

However, in many circumstances the differences between option choice and action choice are subtle, and therefore may not influence our decision strategy appropriately. Keeping our options open is not necessarily the best strategy if it *means* that we forgo the single best option. It is possible to speculate that the *advantages* associated with action choice have "crept" into modern consumer culture, and we are now often attracted to choice *per se.* In other words, the lure of choice is a by-product of the over-generalisation and sometimes inappropriate use of a preference for choice heuristic.

The next section identifies how conceptualising the lure of choice as a by-product of an evolutionarily-determined preference for choice heuristic can help reconcile some of the mixed findings in the literature regarding preference for choice outlined in Chapter 2.

6.6. The "choice is good/choice is bad" debate: Unravelling the paradox of choice.

As noted in previous chapters, there is a wealth of contradictory evidence regarding the value attached to choice by humans, reflecting the fact that people seem to want choice at some levels, yet do not always know what to do with it. A

number of observations drawn from the literature and based on the work presented here can help reconcile some of these contradictory findings.

Firstly, as introduced in Section 2.4, it is widely accepted that there is a fundamental difference between revealed and constructed preferences (Bettman et al., 1998; Fischhoff, 1991; Gregory et al., 1993; Slovic, 1995). The extent to which experimental tasks reflect or measure these different preferences is an important aspect of how their results should be interpreted. Chernev (2003b) showed that people are more likely to choose from a larger set when they have an articulated preference set (i.e. one that is readily retrievable or able to be revealed easily) than when they do not have a readily available articulated preference.

This point can be illustrated by reference to two studies whose contradicting findings influenced the investigation of the lure of choice. In the choice sets used by Iyengar and Lepper (2000), discussed in Section 2.9.2.i, the most popular jam flavours were screened out to avoid ceiling effects, hence it is possible that the lack of motivation to act that was observed was in part due to the fact that participants were required to choose from a choice set for which they did not have a readily available articulated preference set. On the other hand, as discussed in Section 5.3.1, Brenner et al.'s (1999) respondents were not primed to actually choose an individual item (if they selected the grouped set) and hence could have been less likely to use an articulated preference set for the options available. If Chernev's (2003b) reasoning is correct, this could have been related to their preference for the lone option over the choice set.

There is also a parallel between Chernev's finding and the active/passive decision distinction made in Section 6.5 above. When people are expecting to act (or at least make an active choice) rather than simply express a preference, it is possible they are more likely to have, or develop, an articulated preference between options.

The articulated preference argument would also therefore predict a preference for choice from a larger choice set in an active context than in a passive context.

The second observation that could help in our understanding of seeming contradictions in the literature is that the choice process (even for apparently straightforward decisions) can be considered a multi-stage process[20]. As Chernev (2006) suggested, consumer decision making amongst assortments is guided by two potentially conflicting goals – first, when choosing an assortment (called a direct evaluation in the terminology of Sood et al., 2004), the goal is to maximise decision flexibility and hedge bets against future uncertainty. Second, when choosing an option from a given assortment (a derived evaluation, Sood et al.), the goal is to simplify the decision process and select the best available option. Potential confusion can arise between the two different stages, and an over-emphasis on the former could lead people to be myopic, focussing too much on immediate direct comparisons rather on the later derived evaluations (Sood et al., 2004; see also Hsee, Yu, Zhang and Zhang, 2002; Kahneman & Lovallo, 1993). A failure to successfully make the transition from the first stage to the second could account for the choice-overload effect (Iyengar & Lepper, 2000) whereby the initial tendency towards a preference for choice is followed by a demotivation to act on it (see Section 2.9.2.i).

This notion of myopic maximization (Hsee et al., 2002) is also in line with the suggestion presented here that the lure of choice has developed as a decision heuristic. Blindly following a "choice is better than no choice" heuristic corresponds to first-stage short sightedness, and the inadvertent consequences might be an outcome that is not what would have been received by opting for the individual item

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[20] c.f. Huber & Puto's (1983) multi-stage account of combined context effects, Section 2.5.6.

that most meets one's needs, achieved by a second-stage comparison and evaluation of all options.

The empirical results described in Section 6.5.3 illustrate the dysfunctional outcomes associated with following a preference for choice decision rule. For example, in Study 7 (the Spinner game), people were attracted in the direction of choice even though it was made explicit that *only one option was allowed*, and the possibility of changing one's mind was not available because the one-off decision was finite. This suggests that the lure of choice, as a behavioural heuristic, might be used in situations in which it is not the most appropriate strategy.

It is proposed above that the preference for choice heuristic developed (perhaps subconsciously) to give us a competitive advantage over our natural rivals and became part of our basic human endowment. It is possible that we are now starting to recognise (at some level) that this heuristic has crept into many aspects of our lives, sometimes inappropriately, and that in the most extreme form, it no longer meets our requirements, hence the paradox of choice has emerged. Of course, the illustrations of the lure of choice presented here are some way from a situation where craving choice might make a person ill, as suggested by some (Schwartz, 2004), but if taken to an extreme the behaviour and outcomes it predicts could be uncomfortable (not least achieving suboptimal outcomes). The next section considers some more implications of the lure of choice in contemporary life.

6.7. Implications of the lure of choice

This section addresses research question vii: "If people are attracted to choice, what are the implications of this?" There are many situations in which we face decisions between choice sets that have been created for us by others who are far-from-disinterested. To name but a few, there are the movies at a cinema

multiplex, the groceries in a supermarket and the dishes on a restaurant menu. There is a clear trend in marketing to increase the number and variety of goods on offer (Kahn & McAlister, 1997). Often, this is at a cost to the consumer in the form of greater distances to travel, increased search costs and possibly higher prices. Moreover, in almost all categories relatively few goods take the greatest share of the sales, and the goods are often indistinguishable. The needs of most consumers, therefore, could be met by offering much less choice than there is. Yet the inherent attractiveness of choice, even when it is disconnected from any ultimate benefits, leads retailers to offer it and consumers to be lured to it. Below are three contemporary examples in different domains where the lure of choice appears to have direct relevance.

6.7.1. Health provision

The topic of health provision, especially in the UK, is currently an important social and political topic. "Choose and book" is a government initiative which is ostensibly designed to offer the patient greater control over their own treatment, but which has received extremely mixed reactions from health professional and patients (Bate & Robert, 2005; Lewis, 2005). Choose and book is the process whereby a patient visiting a general practitioner (GP), selects the location of their specialist treatment there and then. Bryant, Bown, Bekker & House (under review) argue that the lure of choice might operate under these circumstances. Consider, for example, a person visiting a GP for chronic back pain. There are two main treatments available: either pain management, drug therapy and monitoring by GP, or corrective surgery (both with associated costs and risks). If the surgery is available at a number of hospitals, and the choose and book system is in operation, the decision might be presented in a format very similar to the experimental context used here that resulted

in the lure of choice. That is, if the decision presented is either drug therapy at your GPs *or* surgery at your choice of hospital, the lure of choice might make the second route more attractive to patients, possibly leading them to a course of treatment that is actually less suitable or desirable to them (i.e. surgery). Furthermore, it may not only be the patients who demonstrate the lure of choice effect – doctors, in their recommendations or advice may not be immune to its influence. Of course other decisional effects (such as framing effects) might also operate in this specific domain, but the lure of choice is an undesired consequence that ought to be considered.

6.7.2. *Eating habits*

Another high profile topic in the UK at the moment is the issue of healthy eating, particularly in our schools. In a highly publicised campaign, chef Jamie Oliver has spear-headed an effort to improve the quality of food served in UK schools. On the whole this has received support from government and most parents. However, according to the media, many children and some parents have been resistant to the changes introduced, with drops in the numbers of students taking school meals (Iggluden, 2006). In extreme cases some mothers from Rotherham have been supplying fast food through the school railings at lunchtimes (Stokes, 2006). Research on the lure of choice suggests ways of making the transition to the healthy menu easier. It could be argued that if students first had to choose between a single item of food from the "old style" menu and their choice of a number of healthier items, the lure of choice would work in favour of the healthier options. This measure on its own would be a high risk strategy. Although fairly robust, it is unlikely that the lure of choice alone is strong enough to overcome the attraction of

"turkey twizzlers," but could perhaps be used in conjunction with a number of other approaches.

One could also apply the principles of the lure of choice to our own personal eating habits. If one has a weakness for chocolate, all good intentions aside, we know that for immediate decisions we are likely to choose the vice over the virtue (Read et al., 1999; Read & van Leeuwen, 1998). However, rather than thinking of a snack as a choice between a Mars bar and an apple, if we can reconceptualise the choice as one between the Mars bar and our choice from a fruit bowl overflowing with a variety of different options, the lure of choice suggests that a healthy item would stand a better chance of being selected than if it was presented alone.

6.7.3. Insurance purchasing

There is evidence that offering goods as choices (rather than straight forward decisions) means that people are more likely to buy them. In a series of studies, Szrek and Baron (in press) have found that people are more willing to buy an insurance policy (health, home, travel etc.) when it is presented to them as a choice between policy A or an inferior policy B, rather than as a decision ("whether or not to buy policy A"). Furthermore, these authors found that people were willing to pay more for the same policy when they had chosen it for themselves from a small set of options than when it was the only option available. This increased willingness to adopt an insurance plan when perceived as a choice rather than as a decision has implications for how health and retirement policies that might be offered by employers to their staff (Szrek & Baron, 2006).

This example of the marketing implications of the lure of choice is in a specific domain, but the same principle could be applied to any marketing context. These three examples have shown how the presence or absence of choice, or how a

range of options is presented, might have an impact on our everyday lives. These observations can be important to both those offering goods (the marketers and retailers) and those making the decisions (us, the consumers).

6.8. Future directions

The studies presented here provide evidence of a new, robust decision effect. However, they should be considered as the foundation for a sustained programme of future research rather than a fait accompli. Whilst taken together they provide a basis for the conclusions drawn regarding the lure of choice being a by-product of a previously unrecognized preference for choice decision heuristic, there are a number of other lines of enquiry that would elucidate the causes and mechanism of lure of choice more clearly. This section outlines three possible studies that build on the existing work; a psychometric study that investigates the subtle relationships between lures and targets that may or may not result in the lure of choice, a study that differentiates the possible explanations for the lure of choice and a study that explicitly investigates the notion that the lure of choice is a decision heuristic.

As discussed in Section 6.3 above, an important question that needs to be addressed is under exactly what conditions does the lure appear, and when does it not? The discussion of Studies 1-7 earlier in this chapter, supported by Figure 16 and Table 14, suggest that the lure of choice effect is fairly consistent. However, this issue would benefit from further clarification. The explicit purpose of Studies 1-7 was to demonstrate the effect per se and test other possible explanations for it, not to compare the sizes of lure effects with different relationships on descriptive dimensions. For this reason, the exact value of targets and sure things and lure was not controlled across studies.

When the whole range of studies (1-10) is considered, we see that the lure of choice was demonstrated in Study 8 (Monty Hall) and Studies 9a, 9b and 10 (involving choices of foodstuffs), which did not use two dimensional descriptions of the options at all. The decisions in later studies were between *unitary items* (a simple global description, not described in terms of values on varying dimensions) rather than *multi-dimensional ones* (described in terms of values on at least two dimensions). When options are described fully on two dimensions, their dominance or relative superiority should be more transparent than unitary ones, and one might speculate that the value (positive or negative) of being part of a choice set would be relatively easy to integrate into the subjective evaluations of options. Selections made from a range of unitary items rely more heavily on participants' preferences and background knowledge of options, and the lure of choice operates alongside, or over and above, such subjective preferences. Although it is argued that the lure of choice is less to do with the relative values on such dimensions, and more to do with simple choice *per se*, it is still important to compare preference for choice with unitary items versus multi-dimensional options, which would involve a systematic parametric investigation of items that vary on least two dimensions (i.e. multi-attribute).

In the early studies presented here, there were no examples of symmetrically dominating and asymmetrically dominating lures and a preponderance of asymmetrically dominated lures, with a couple of examples of compromise lures, one symmetrically dominated lure and one compromise lure. A systematic investigation of the full range of multi-attribute lures would contribute to our understanding of the relationship between the lure of choice and other context effects such as the asymmetric dominance effect and compromise effect.

Another interesting avenue to explore would be the extent to which multi-attribute descriptions (such as those used in the early studies) as opposed to unitary descriptions (as used in the later studies) help or hinder the lure of choice. Indeed, it may be that the nature of the lure of choice that was demonstrated in these types of cases was qualitatively different, with different underlying mechanisms. It could be that the former is more akin to a context effect (that has been *distilled from* an original evolutionarily advantageous heuristic) and the latter is a more direct illustration of this decision heuristic. These possible differences could be teased out experimentally, utilising the floating lure design that would compare the multidimensional lures described above with equivalent unitary lures to investigate more fully the extent to which the lure of choice is caused by dimensional relationships or choice *per se*. Further details of a potential such study are described in Appendix L.

The second possible follow up study addresses a number of remaining issues. Firstly, is the lure of choice stronger when there are more choices? Evidence reviewed in Section 6.4.5 indicate that there was little difference between choice sets with two, three of four items. However, this range is quite small compared to the range of choice we face as consumers (as illustrated in the examples in Chapter 1), and as investigated in previous research (e.g. Iyengar & Lepper, 2000; Jacoby et al., 1974). A further systematic experiment would resolve this. Using a floating lure design, a no choice option could be compared with a number of conditions with larger ranges of options (perhaps 2, 6 and 10 options). Although it is possible (and perhaps likely) that the marginal impact of adding items to a choice set decreases (the biggest impact occurs when moving from 1 to 2 options, the next biggest with the move to 3 options, and so on) it is still important to conduct this kind of

exhaustive evaluation in order to extend our understanding of the parameters of the lure of choice.

In addition, this study would be able to differentiate possible explanations of lure of choice. The preference for choice heuristic explanation for the lure of choice should differentiate between conditions on the basis of the number of options. The heuristic "it is better to choose from a larger than a smaller array" would predict a stronger lure of choice when the target is in a choice set of 6 or 10 items than in a choice set of 2 items. However, the "staying in the game" "prolonging the fun" and "deferring commitment" explanations (Sections 6.4.6.i–iii) should not differentiate between the conditions.

The third proposed future study would be somewhat exploratory, and addresses the possibility that the lure of choice is governed by a subconsciously applied decision heuristic. In line with other dual process theories (see Chaiken & Trope, 1999, for a review) that distinguish between "intuition" and "reason" in human thinking, Kahneman and Frederick (2002) identified two sets of cognitive operations that underlie human judgement: System 1 and System 2. System 1 processes are quick, associative and heuristic and System 2 are slow, deliberate and rule governed. The authors proposed that the two systems interact in the following way: faced with a judgement problem, System 1 quickly proposes an intuitive answer. System 2 monitors the quality of these proposals, which it may endorse, correct or override. If intervention by System 2 is minimal, and the judgement represents the initial proposal, it is described as an intuitive judgement. The two Systems operate concurrently and compete for the control of overt responses. The extent to which the two processes are involved in determining judgements depends on a number of factors such as time available (Finucane, Alhakami, Slovic & Johnson, 2000); respondents' mood (Bless, Schwarz & Kemmelmeier, 1996; Isen,

Nygren & Ashby, 1988) intelligence (Stanovich & West, 1998) and exposure to statistical thinking (Agnoli, 1991; Agnoli & Krantz, 1989; Nisbett, Krantz, Jepson & Kunda, 1983).

Controlled thinking (processing of abstract concepts) that governs the performance of unfamiliar tasks can, and sometimes should, over-ride otherwise intuitive operations, as this is how biases caused by heuristics are usually avoided. If the lure of choice is caused by a (largely unconscious) heuristic, we would describe it as a System 1 operation. If that is the case, we could therefore expect that under some circumstances, deliberate, effortful System 2 operations (careful consideration of all options to select the best) overcome a decision to simply select choice when it does not lead to the subjectively preferred outcome. Furthermore, we could predict that under conditions of time pressure or cognitive load, the ability of System 2 operations will be reduced, and we would witness more acceptance of the initial System 1-induced preference for choice. The extent to which the lure of choice increases or decreases with time pressure or additional cognitive load could be interpreted as the extent to which it is an unconscious decision heuristic.[21]

This section has introduced three examples of how work on the lure of choice could be continued in order to develop the main themes emerging from the theoretical discussion of its causes and consequences.

6.9. Methodological reflections

No experimental investigation is without limitations, this is the trade-off that one accepts in order to maintain a high degree of control over manipulations

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[21] We should also be aware, however, that the use of any heuristic can be a deliberate action (Gigerenzer and Goldstein, 1996, Gigerenzer et al., 1999). Such a strategy could be retrievable by asking people to explain their choices.

(Saunders, Lewis, & Thornhill, 2003). This section addresses possible methodological concerns and indicates how these were resolved.

One of the main criticisms of this type of research is the use of student participants rather than representative samples from the general public. Given the large number of participants required for this series of studies (over 2,000 people in total) the use of students was to some extent unavoidable. However, in Studies 5 and 6 (the nightclub and bank floating lure studies) the participants *were* members of the general public. A similar pattern of findings were observed with both samples. Hence, the use of a student population as a representative sub-section of the general public can be considered justifiable. Related to this point, it should be noted that the vast majority of the undergraduates and the general public who took in these studies were British. As discussed in Section 2.9.3, there may be some fundamental differences between attitudes to choice in Western and Eastern cultures, and the results and conclusions of this thesis should be interpreted with this in mind.

A concern regarding *all* participants' involvement with this kind of experiment which may have had an impact on the results and their interpretation involves people's motivation to take part. As discussed in Section 6.4.6, a motivation for behaving or choosing in a particular way might be to "stay in the game" or "prolong the fun". This of course is an acceptable motivation if it reflects how people view similar decisions in the real world. However, some of the real world decisions which were modelled by these experiments (choosing a meal, deciding on a bank and so on) would be far less likely to be treated as a game if acted out for real. If some participants saw the exercise as a "game", with few real consequences (other than delaying the start of a class by a few moments) they may have been operating with a different kind of motivation than they would under other circumstances. In the worst case scenario, there is a chance that some participants,

motivated to "stay in the game", may have opted for a route leading to choice rather than sure thing or a decision that ended the game immediately, thus biasing the results in a particular direction. Although this is speculative (and it is also possible that there were a number of participants who wanted to end the experience as quickly as possible by choosing the lone item), such subtle differences in motivation would be an important factor to investigate in future research, perhaps by using real decisions with actual consequences. Although not wrong, the motivation "to stay in the game" is different to "deferring cognitive effort." This demonstrates one of the potential drawbacks associated with asking hypothetical questions in experiments.

This issue is also related to the drawbacks associated with the use of scenarios in experimental research. While it is critical to try to be as realistic as possible when modeling the kinds of decisions made in the real world, this work was also designed to achieve a balance of gambles (with controllable payoff and probabilities), options that were unitary (not described along evaluative dimensions) and realistic scenarios. The interpretation of results using this range of approaches is consistent.

Finally, this section summarises what had been learnt about the research process. As a piece of developmental work, especially one that has been conducted over a period of time, it has become clear that is critical to have a clear focus for each stage in the research process (in this case for each set of studies), yet at the same time to be responsive to both developments in the field and unpredicted results (for example, the initial failure to replicate Brenner et al., 1999). In particular, a number of important and relevant publications emerged in the field during the course of this work, which ultimately guided and informed the design of later studies, interpretation of results and conclusions (notably Brenner et al., 1999; Iyengar & Lepper, 2000; Schwartz, 2004). Furthermore, it is also critical to keep an eye on the "bigger

picture," in terms of what the research findings contribute to both our academic and theoretical knowledge, but also what it says about the world in which we live.

6.10. Concluding comments

This thesis started by discussing behavioural decision theory as a relatively young discipline but one that has developed exponentially in recent years. This popularity is no doubt due in large part to BDT's ability to address numerous issues of relevance to almost every aspect of our lives. This thesis was conducted to participate in that contribution. Initially inspired by the apparent burgeoning of choice faced by the consumer, the aim of the programme of research was to better understand how humans react when faced with increased choice. Early in the process, a new decision effect, the lure of choice, was demonstrated and the remainder of the experimental work revolved around investigating this further.

At an empirical level, this work has contributed a corpus of rigorously conducted experiments using a range of methodologies and materials with a large number of participants. The majority of these demonstrate the lure of choice, indicting that it is a moderate and robust effect. Given that even in the most carefully designed and controlled decision experiments a number of different processes might be operating, being able to demonstrate a consistent, predictable effect in a range of contexts is satisfying.

At a theoretical level, the lure of choice was distinguished from other context effects such as the asymmetric dominance effect. Further experiments and discussion have contributed the theoretical proposition that the lure of choice is a demonstration of a generalised decision heuristic that leads people to favour choice over no choice. Whilst this was evolutionarily advantageous to our ancestors, in a consumer-oriented world, an over-reliance on it can be inappropriate and even

dysfunctional. These specific theoretical arguments contribute to our understanding of some of the contradictions observed in the behavioural and consumer decision making literature.

In addition to these empirical and theoretical contributions, this work has made some specific comments about the possible practical implications of a (sometimes misguided) preference for choice. In particular, it has outlined how an understanding of the lure of choice could have possible uses in marketing, not only of consumer good, but also of lifestyle and policy decisions. As a behavioural effect, the lure of choice would appear to be making the transition from evolutionarily advantageous decision strategy to marketer's tool, capable of influencing the decisions of consumers. The better our understanding of the effect, the more effectively we can address this issue.

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Appendix A - Materials for Study 1.
Appendix Ai: Study 1 – No-choice condition.

A Strategic Dilemma for Cups 'n' Sups

Imagine that you own a small company, Cups 'n' Sups (employing 7 full-time members of staff), which organises hospitality facilities for conferences and concerts (e.g. bar and catering facilities). Every August for the past 8 years you have provided services at a local pop outdoor concert, Kirkbridge Festival, a relatively small, but popular and enjoyable event. The organisers of next year's festival have offered you a guaranteed payment of £20,000 (after costs) and have asked for a firm commitment now (with a penalty clause if you pull out after agreeing to provide your services).

However, you are also aware of a call for tenders for a number of hospitality providers at next year's V2000 pop at Temple Newsam Park, Leeds, planned for exactly the same weekend next August as Kirkbridge Festival. The call for tenders is a two-stage process.

The first round is a general call for tenders from companies for either concert. In previous years, 80% of applicants fail to get through this round and only 20% are selected to go through to the second round.

In the second round, successful applicants bid for the two concert venue. In previous years, 75% of applicants for Temple Newsam were selected; you forecast that by working at this site Cups 'n' Sups would stand to make £150,000 profit.

The timing of these events and the deadlines for acceptance and tenders means that you need to decide now which course of action to pursue. In other words, you face the following pair of sequential decisions. **First examine both stages**, then indicate the option you prefer.

PTO.

<u>Stage 1:</u>

Choose between:

A)   The Kirkbridge Festival:

> with a sure payment of £20,000.

B)   The V2000 First Round tender with:

> 80% chance of being rejected and earning nothing
>
> 20% chance of going through to Round 2.

<u>Stage 2.</u> If you get to Round 2, you will have:

C)   75% chance of being accepted and earning £150,000

> 25% chance of being rejected and earning nothing

As the owner of Cups 'n' Sups, what decision will you make now at **Stage 1**?

Please circle your answer: A / B

Are you:	male / female
Age:	

Thank you for your participation.

Appendix Aii: Study 1 – Choice condition.

A Strategic Dilemma for Cups 'n' Sups

Imagine that you own a small company, Cups 'n' Sups (employing 7 full-time members of staff), which organises hospitality facilities for conferences and concerts (e.g. bar and catering facilities). Every August for the past 8 years you have provided services at a local pop outdoor concert, Kirkbridge Festival, a relatively small, but popular and enjoyable event. The organisers of next year's festival have offered you a guaranteed payment of £20,000 (after costs) and have asked for a firm commitment now (with a penalty clause if you pull out after agreeing to provide your services).

However, you are also aware of a call for tenders for a number of hospitality providers at next year's V2000 pop concerts. As in previous years, this is a simultaneous two-site event (Chelmsford and Temple Newsam Park, Leeds), planned for exactly the same weekend next August as Kirkbridge Festival. The call for tenders is a two-stage process.

The first round is a general call for tenders from companies for either concert. In previous years, 80% of applicants fail to get through this round and only 20% are selected to go through to the second round.

In the second round, successful applicants bid for **one** of the two concert venues. In previous years, 75% of applicants for Temple Newsam were selected; you forecast that by working at this site Cups 'n' Sups would stand to make £150,000 profit. In previous years, 75% of applicants for Chelmsford were selected; you forecast that by working there, Cups 'n' Sups would stand to make £50,000 profit.

The timing of these events and the deadlines for acceptance and tenders means that you need to decide now which course of action to pursue. In other words, you face the following pair of sequential decisions. **First examine both stages, then** indicate the option you prefer.

PTO.

Stage 1:

Choose between:

A)   The Kirkbridge Festival:

        with a sure payment of £20,000 (no further decisions need be made).

B)   The V2000 First Round tender with:

        80% chance of being rejected and earning nothing

        20% chance of going through to Round 2.

Stage 2. If you get to Round 2, you will:

Choose between:

C)   Temple Newsam tender

        75% chance of being accepted and earning £150,000

        25% chance of being rejected and earning nothing

D)   Chelmsford tender

        75% chance of being accepted and earning £50,000

        25% chance of being rejected and earning nothing.

As the owner of Cups 'n' Sups, what decision will you make now at **Stage 1**?

Please circle your answer: A / B

Please do not turn over until you are instructed to do so.

Assume that you got through to Round 2.

Round 2

Choose between:

C)   Temple Newsam tender

75% chance of being accepted and earning £150,000

25% chance of being rejected and earning nothing

D)   Chelmsford tender

75% chance of being accepted and earning £50,000

25% chance of being rejected and earning nothing.

Which option would you select at **Round 2?**

Please circle your answer: C / D

Are you:	male / female
Age:	

Thank you for your participation.

Appendix B - Materials Study 2.

Appendix Bi: Study 2 – No-choice condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money.

At the first stage you must decide whether to quit and take your winnings, or take a chance to move on to the next stage where you might win a larger amount of money.

First examine both stages, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £20 (the game ends here)

B)   80% chance of winning nothing (the game ends here)

20% chance of going through to Stage 2.

If you get to Stage 2, you will have:

C)   75% chance of winning £150

25% chance of winning nothing

Which option would you select at **Stage 1**?

Please circle your answer: A / B

Are you:	male / female
Age:	

Thank you for your participation.

Appendix Bii: Materials Study 2 – dominated-condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money. At each stage, you decide between alternative courses of action. At the first stage you must decide whether to quit and take your winnings, or take a chance to move on to the next stage where you might win a larger amount of money. If you continue, at the second you must choose between two pairs of gambles.

You face the following pair of sequential decisions. **First examine both stages**, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £20 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
         20% chance of going through to Stage 2.

If you get to Stage 2, you will:

Choose between:

C)   75% chance of winning £150
         25% chance of winning nothing

D)   75% chance of winning £50
         25% chance of winning nothing.

Which option would you select at **Stage 1**?

Please circle your answer: A / B

Please do not turn over until you are instructed to do so.

Assume that you got through to Stage 2.

Stage 2:

Choose between:

C)   75% chance of winning £150

        25% chance of winning nothing

D)   75% chance of winning £50

        25% chance of winning nothing.

Which option would you select at **Stage 2**?

Please circle your answer: C / D

Are you:	male / female
Age:	

Thank you for your participation.

Appendix Biii: Materials Study 2 – conflicted-condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money. At each stage, you decide between alternative courses of action. At the first stage you must decide whether to quit and take your winnings, or take a chance to move on to the next stage where you might win a larger amount of money. If you continue, at the second you must choose between two pairs of gambles.

You face the following pair of sequential decisions. **First examine both stages**, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £20 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
       20% chance of going through to Stage 2.

If you get to Stage 2, you will:

Choose between:

C)   75% chance of winning £150
       25% chance of winning nothing

D)   90% chance of winning £50
       10% chance of winning nothing.

Which option would you select at **Stage 1**?

Please circle your answer: A / B

Please do not turn over until you are instructed to do so.

Assume that you got through to Stage 2.

Stage 2

Choose between:

C)   75% chance of winning £150

        25% chance of winning nothing

D)   90% chance of winning £50

        10% chance of winning nothing.

Which option would you select at **Stage 2**?

Please circle your answer: C / D

Are you:	male / female
Age:	

Thank you for your participation.

Appendix C- Materials for Study 3.
Appendix Ci: Study 3 – No-choice condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money.
At the first stage you must decide whether to quit and take your winnings, or take a
chance to move on to the next stage where you might win a larger amount of money.

First examine both stages, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £30 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
        20% chance of going through to Stage 2.

IF you get to Stage 2, you will have:

C)   75% chance of winning £150
        25% chance of winning nothing

Which option would you select at **Stage 1?**

Please circle your answer: A / B

	male / female
Age:	

Thank you for your participation.

Appendix Cii: Study 3 – Dominated-choice condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money. At each stage, you decide between alternative courses of action. At the first stage you must decide whether to quit and take your winnings, or take a chance to move on to the next stage where you might win a larger amount of money. If you continue, at the second you must choose between two pairs of gambles.

You face the following pair of sequential decisions. **First examine both stages**, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £30 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
      20% chance of going through to Stage 2.

If you get to Stage 2, you will:

Choose between:

C)   75% chance of winning £150
      25% chance of winning nothing

D)   70% chance of winning £120
      30% chance of winning nothing.

Which option would you select at **Stage 1**?

Please circle your answer: A / B

Please do not turn over until you have answered the question above.

Assume that you got through to Stage 2.

Stage 2:

Choose between:

C)   75% chance of winning £150

25% chance of winning nothing

D)   70% chance of winning £120

30% chance of winning nothing.

Which option would you select at **Stage 2?**

Please circle your answer: ·   C / D

Are you:	male / female
Age:	

Thank you for your participation.

Appendix Ciii: Study 3 – Conflicted-choice condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money. At each stage, you decide between alternative courses of action. At the first stage you must decide whether to quit and take your winnings, or take a chance to move on to the next stage where you might win a larger amount of money. If you continue, at the second you must choose between two pairs of gambles.

You face the following pair of sequential decisions. **First examine both stages**, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £30 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
      20% chance of going through to Stage 2.

If you get to Stage 2, you will:

Choose between:

C)   75% chance of winning £150
      25% chance of winning nothing

D)   90% chance of winning £100
      10% chance of winning nothing.

Which option would you select at **Stage 1**?

Please circle your answer: A / B

Please do not turn over until you have answered the question above.

Assume that you got through to Stage 2.

Stage 2:

Choose between:

C)   75% chance of winning £150

       25% chance of winning nothing

D)   90% chance of winning £100

       10% chance of winning nothing.

Which option would you select at **Stage 2**?

Please circle your answer: C / D

Are you:	male / female
Age:	

Thank you for your participation.

Appendix D: Materials for Study 4.
Appendix Di: Study 4 – No-choice condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money.
At the first stage you must decide whether to quit and take your winnings, or take a
chance to move on to the next stage where you might win a larger amount of money.

First examine both stages, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £30 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
      20% chance of going through to Stage 2.

IF you get to Stage 2, you will have:

      75% chance of winning £150
      25% chance of winning nothing

Which option would you select at **Stage 1**?

Please circle your answer: A / B

	male / female
Age:	

Thank you for your participation.

Appendix Dii: Study 4 – High-contrast condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money. At each stage, you decide between alternative courses of action. At the first stage you must decide whether to quit and take your winnings, or take a chance to move on to the next stage where you might win a larger amount of money. If you continue, at the second you must choose between two pairs of gambles.

You face the following pair of sequential decisions. **First examine both stages**, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £30 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
      20% chance of going through to Stage 2.

IF you get to Stage 2, you will:

Choose between:

C)   75% chance of winning £150
      25% chance of winning nothing

D)   75% chance of winning £50
      25% chance of winning nothing.

Which option would you select at **Stage 1**?

Please circle your answer: A / B

Please only turn over when you have answered the question above.

Assume that you got through to Stage 2.

Stage 2:

Choose between:

C)   75% chance of winning £150

        25% chance of winning nothing

D)   75% chance of winning £50

        25% chance of winning nothing.

Which option would you select at **Stage 2**?

Please circle your answer: C / D

	male / female
Age:	

Thank you for your participation.

Appendix Diii: Study 4 – Low-contrast condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money. At each stage, you decide between alternative courses of action. At the first stage you must decide whether to quit and take your winnings, or take a chance to move on to the next stage where you might win a larger amount of money. If you continue, at the second you must choose between two pairs of gambles.

You face the following pair of sequential decisions. **First examine both stages**, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £30 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
        20% chance of going through to Stage 2.

IF you get to Stage 2, you will:

Choose between:

C)   75% chance of winning £150
        25% chance of winning nothing

D)   75% chance of winning £140
        25% chance of winning nothing.

Which option would you select at **Stage 1**?

Please circle your answer: A / B

Please only turn over when you have answered the question above.

Assume that you got through to Stage 2.

Stage 2

Choose between:

   C)   75% chance of winning £150

           25% chance of winning nothing

   D)   75% chance of winning £140

           25% chance of winning nothing.

Which option would you select at **Stage 2**?

Please circle your answer: C / D

	male / female
Age:	

Thank you for your participation.

Appendix Div: Study 4 – three-choice condition.

The "Two-Stage" Game

Please read the instructions below carefully.

You are about to play a two-stage game where you have the chance to win money. At each stage, you decide between alternative courses of action. At the first stage you must decide whether to quit and take your winnings, or take a chance to move on to the next stage where you might win a larger amount of money. If you continue, at the second you must choose between three gambles.

You face the following sequential decisions. **First examine both stages**, then indicate the option you prefer.

Stage 1:

Choose between:

A)   a sure win of £30 (the game ends here)

B)   80% chance of winning nothing (the game ends here)
       20% chance of going through to Stage 2.

IF you get to Stage 2, you will:

Choose between:

C)   75% chance of winning £140
       25% chance of winning nothing

D)   75% chance of winning £50
       25% chance of winning nothing

E)   75% chance of winning £150
       25% chance of winning nothing.

Which option would you select at **Stage 1?**

Please circle your answer: A / B

         Please only turn over when you have answered the question above.

Assume that you got through to Stage 2.

Stage 2:

Choose between:

C)   75% chance of winning £140

25% chance of winning nothing

D)   75% chance of winning £50

25% chance of winning nothing

E)   75% chance of winning £150

25% chance of winning nothing.

Which option would you select at **Stage 2**?
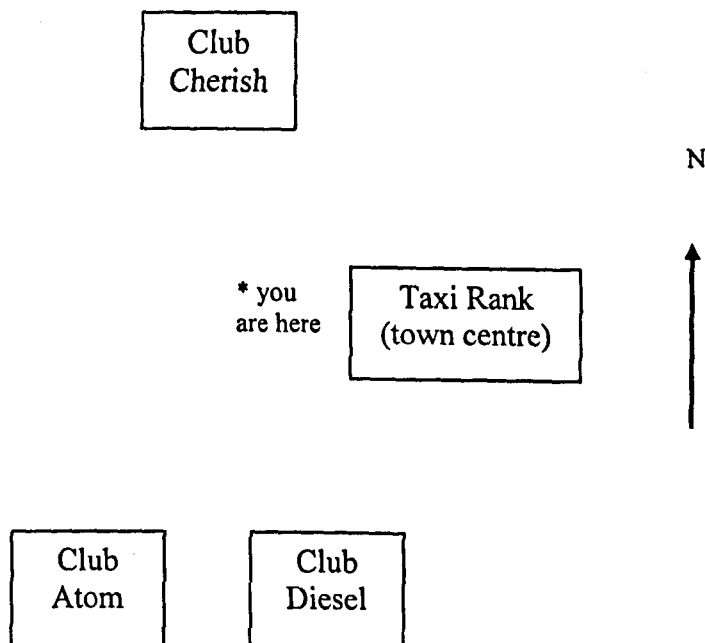

Please circle your answer: C / D / E

	male / female
Age:	

Thank you for your participation.

Appendix E: Materials for Study 5.
Appendix Ei: Study 5: Condition 1 (Club Diesel = Target$_L$).

It is getting late one Friday night and you are out with a group of friends in the centre of your small town. You need to decide where to go next to continue the evening's entertainment. The town has only three nightclubs, two in the north and one in the south. All are about a half-hour taxi ride away (see map below).

```
        ┌──────────┐
        │  Club    │
        │ Cherish  │
        └──────────┘
                                              N

  * you    ┌──────────────┐                   ↑
 are here  │  Taxi Rank   │                    │
           │ (town centre)│                    │
           └──────────────┘                    │

  ┌──────────┐  ┌──────────┐
  │  Club    │  │  Club    │
  │  Atom    │  │  Diesel  │
  └──────────┘  └──────────┘
```

Club Cherish is in the north of the town - the entrance fee is £4, they do not really play your favourite kind of music but you are likely to bump into other friends there.

Club Atom is also in the south of the town – the entrance fee is £15, they play your favourite kind of music and you are likely to bump into other friends there.

Club Diesel is in the south of the town – the entrance fee is £12, they play your favourite kind of music and you are likely to bump into other friends there.

You all climb into the taxi and have to decide whether to go North or South. What do you ask the taxi driver to do? (please circle choice)

go North / go South

Please only turn over when you have answered the question above.

If you chose to go South, which nightclub will you go to? (Please circle your choice)

Club Atom / Club Diesel

About you:	male / female
Age:	

Thank you for your participation.

Appendix Eii: Study 5: Condition 2 (Club Cherish = Target$_L$).

It is getting late one Friday night and you are out with a group of friends in the centre of your small town. You need to decide where to go next to continue the evening's entertainment. The town has only three nightclubs, two in the north and one in the south. All are about a half-hour taxi ride away (see map below).

Club Atom	Club Cherish

N

* you are here	Taxi Rank (town centre)

↑

Club Diesel
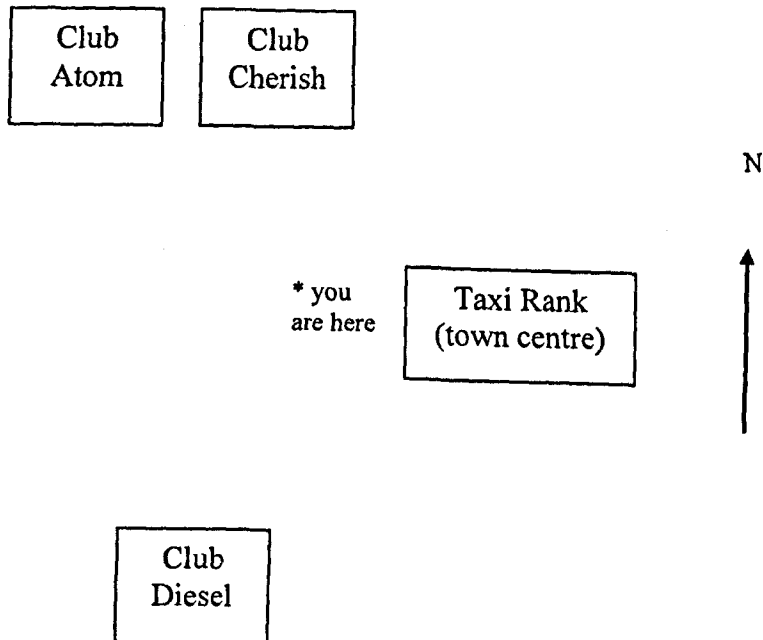
Club Cherish is in the north of the town - the entrance fee is £4, they do <u>not</u> really play your favourite kind of music but you are likely to bump into other friends there.

Club Atom is also in the north of the town – the entrance fee is £15, they play your favourite kind of music and you are likely to bump into other friends there.

Club Diesel is in the south of the town – the entrance fee is £12, they play your favourite kind of music and you are likely to bump into other friends there.

You all climb into the taxi and have to decide whether to go North or South. What do you ask the taxi driver to do? (please circle choice)

go North / go South

Please only turn over when you have answered the question above.

If you chose to go North, which nightclub will you go to? (Please circle your choice)

Club Atom / Club Cherish

About you:	Male / female
Age:	

Thank you for your participation.
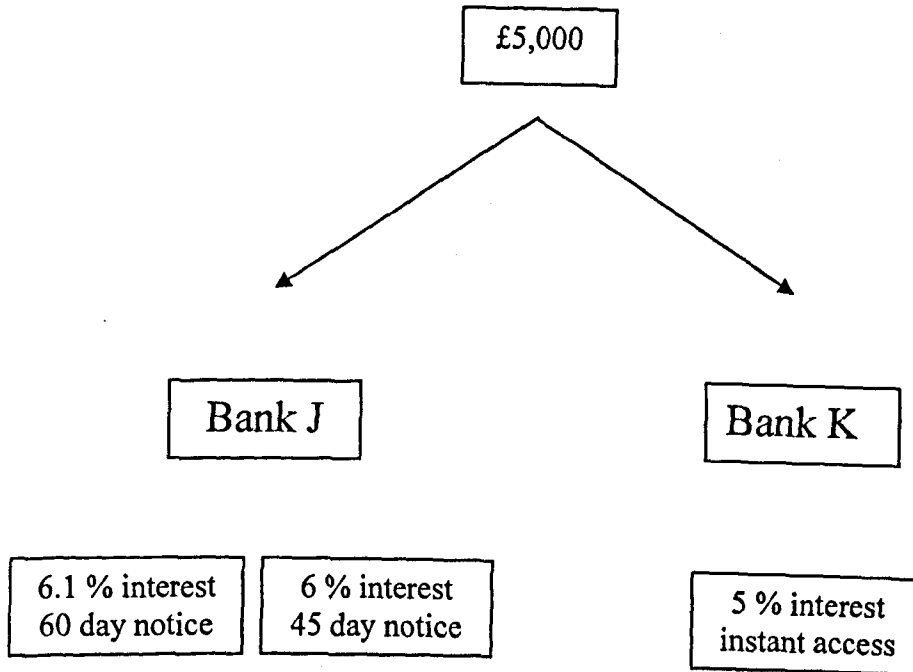
Appendix F. Materials for Study 6.
Appendix Fi: Study 6: Condition 1 - Account 1 = Target_L.

You have just inherited some money from a distant relative and have decided to save £5000 in an individual savings account. You have narrowed your choices down to two banks, Bank J and Bank K.

Bank J offers two accounts. The first offers a 6.1% annual interest rate with a 60 day notice period for withdrawals. The second offers a 6.0% annual interest rate with a 45 day notice period for withdrawals.

Bank K offers a 5% annual interest rate with instant access to your money should you need it.

These options are depicted below.

```
                    ┌──────────┐
                    │  £5,000  │
                    └──────────┘
                    ╱          ╲
                   ╱            ╲
                  ▼              ▼
          ┌──────────┐      ┌──────────┐
          │  Bank J  │      │  Bank K  │
          └──────────┘      └──────────┘

  ┌─────────────┬─────────────┐      ┌─────────────┐
  │ 6.1 %       │ 6 %         │      │ 5 % interest│
  │ interest    │ interest    │      │ instant     │
  │ 60 day      │ 45 day      │      │ access      │
  │ notice      │ notice      │      │             │
  └─────────────┴─────────────┘      └─────────────┘
```

Today you are going to go to one of the banks to deposit your money in one of the accounts. Which bank will you visit?

Please circle your choice.

Bank J / Bank K

Please do not turn over until you have answered the question above.

If you chose to go to Bank J, please indicate the account in which you wish to deposit your money.

Please circle your answer:

6.1 % interest, 60 day notice / 6 % interest, 45 day notice

| About you:	Male / female
Age:	

Thank you for your participation.

Appendix Fii: Study 6: Condition 2 - Account 2 = Target[L]

You have just inherited some money from a distant relative and have decided to save £5000 in an individual savings account. You have narrowed your choices down to two banks, Bank J and Bank K.

Bank J offers 6.1% annual interest rate with a 60 day notice period for withdrawals.

Bank K offers two accounts. The first offers a 5% annual interest rate with instant access to your money should you need it. The second offers a 6.0% annual interest rate with a 45 day notice period for withdrawals.

These options are depicted below.
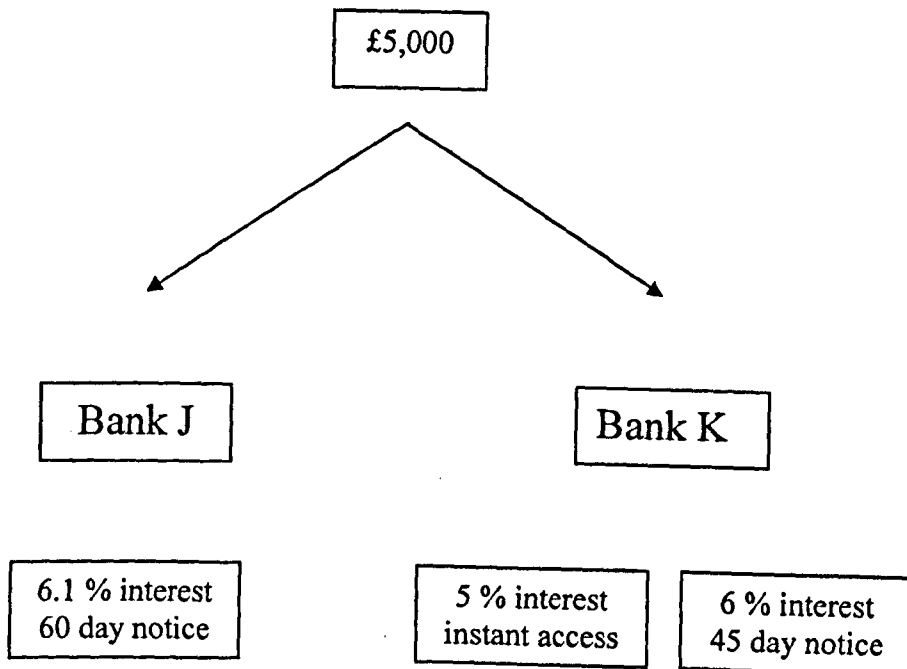
Today you are going to go to one of the banks to deposit your money in one of the accounts. Which bank will you visit?

Please circle your choice.

Bank J / Bank K

Please do not turn over until you have answered the question above.

If you chose to go to Bank K, please indicate the account in which you wish to deposit your money.

Please circle your answer:

5 % interest, instant access / 6 % interest, 45 day notice

About you:	Male / female
Age:	

Thank you for your participation.

Appendix G. Materials for Study 7

Appendix Gi: Study 7 – Condition 1, Dominated lure (Spinner A = Target$_1$) (1 variation)

Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are two tables offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on.
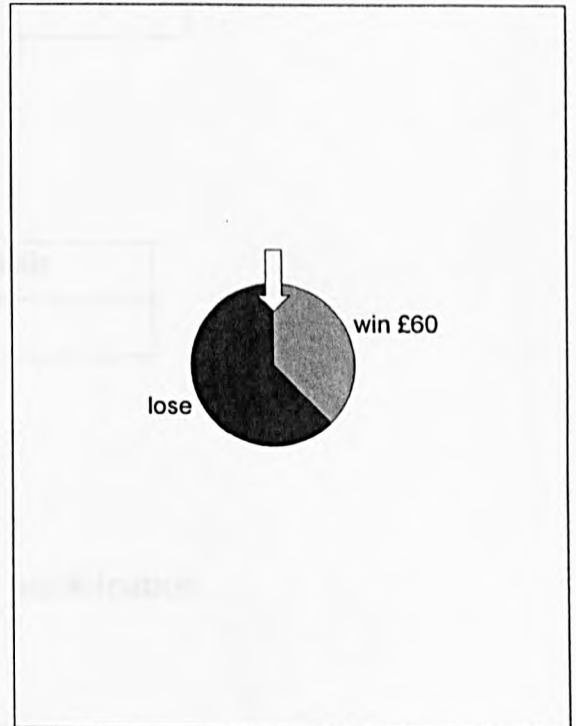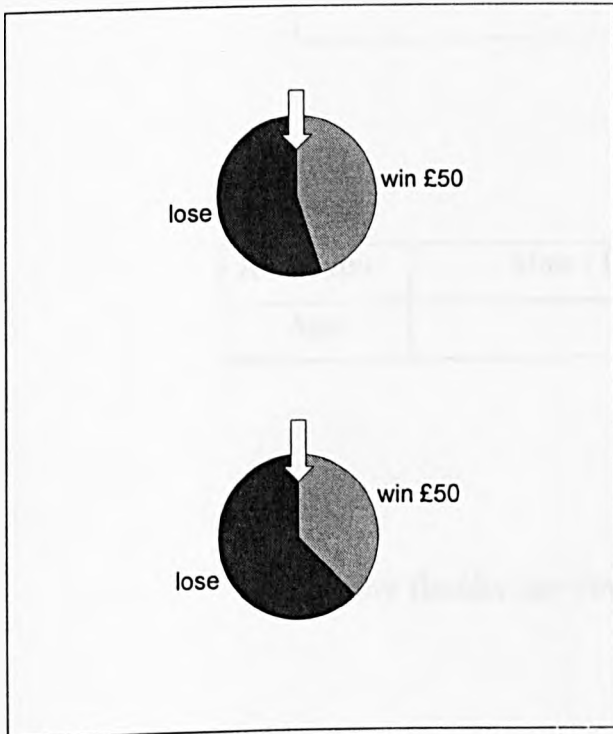
Choose the table at which you would like to spend your token (please tick the relevant box):

Table 1 ☐   Table 2 ☐
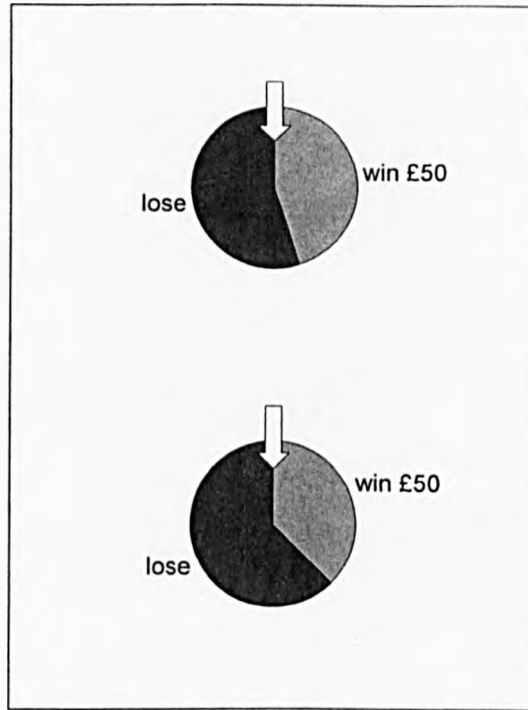
Table 1   Table 2

Please turn over.

If you selected Table 1, please indicate by circling it, the spinner at which you would like to spend your token:

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Gii: Study 7 – Condition 2, Dominated lure (Spinner B = Target_L) (1 variation)

Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are two tables offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on.

Choose the table at which you would like to spend your token (please tick the relevant box):

Table 1 ☐   Table 2 ☐
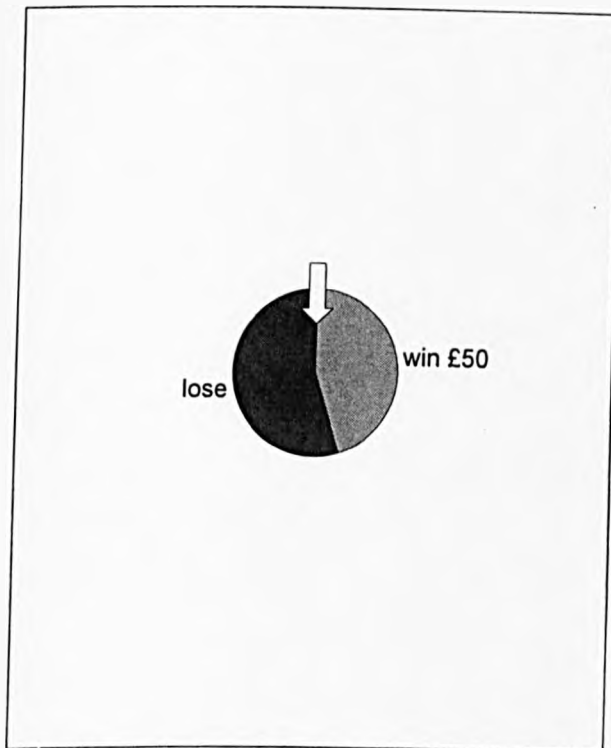
Table 1   Table 2

Please turn over.

If you selected Table 2, please indicate by circling it, the spinner at which you would like to spend your token:
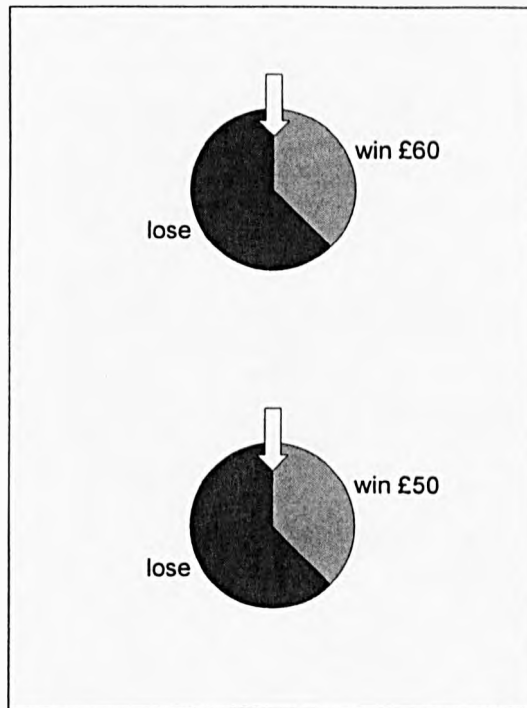
About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Giii: Study 7 – Condition 3, Conflicted lure (Spinner A = Target$_L$) (one variation)

Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are two tables offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on.

Choose the table at which you would like to spend your token (please tick the relevant box):

Table 1 ☐   Table 2 ☐
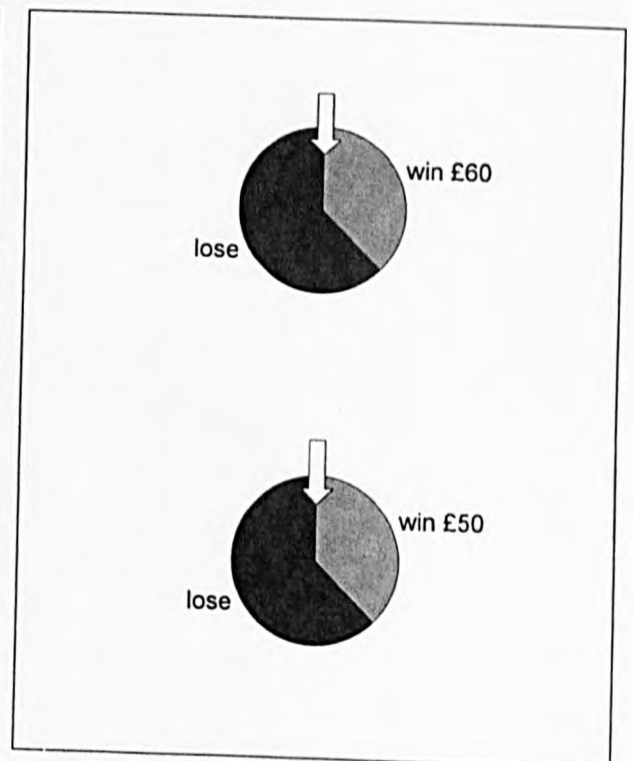
Table 1   Table 2

Please turn over.

If you selected Table 1, please indicate by circling it, the spinner at which you would like to spend your token:

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Giv: Study 7 – Condition 4, Conflicted lure (Spinner B = Target$_L$) (one variation)

Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are two tables offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on.

Choose the table at which you would like to spend your token (please tick the relevant box):

Table 1 ☐   Table 2 ☐
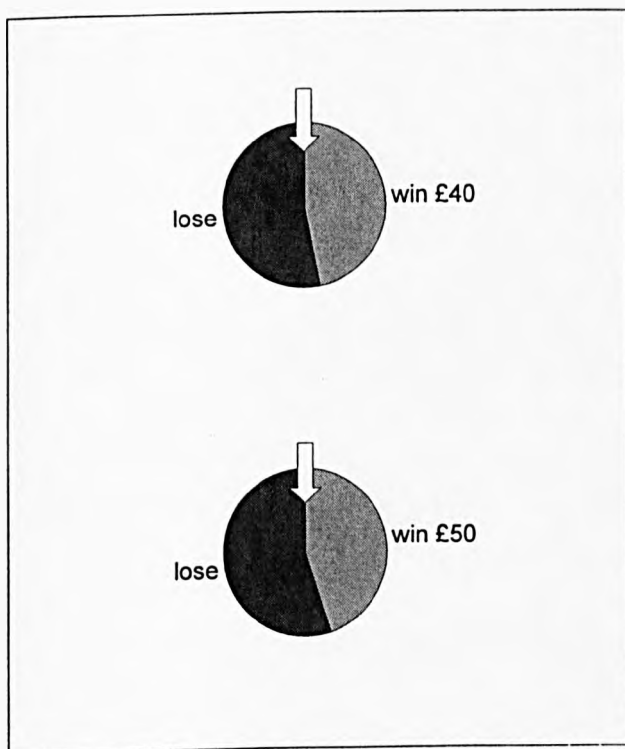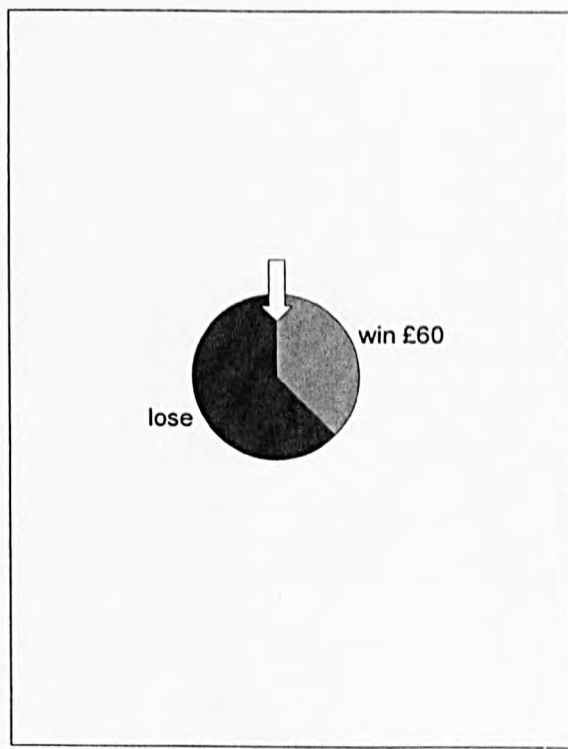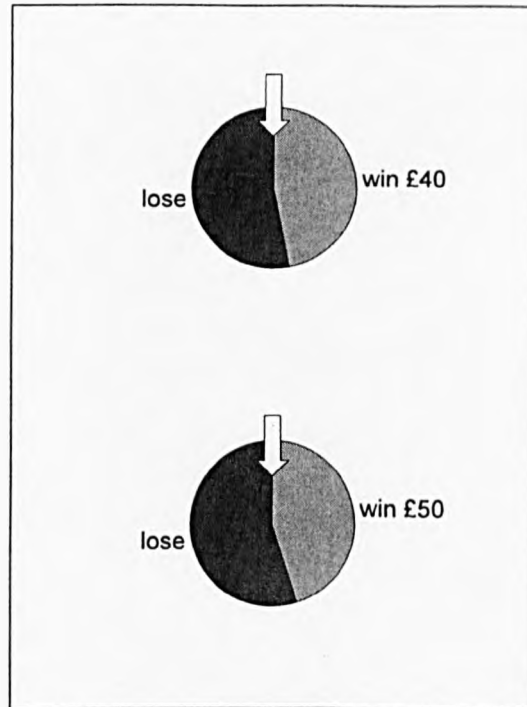
Table 1

Table 2

Please turn over.

If you selected Table 2, please indicate by circling it, the spinner at which you would like to spend your token:

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Gv: Study 7 – Control 1, Dominated lure (Spinner A = Target$_L$) (one variation)

Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are three games offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on.

Choose the spinner at which you would like to spend your token (please circle the relevant spinner).
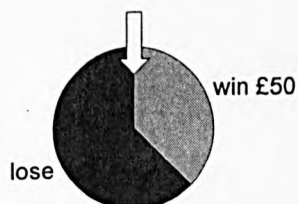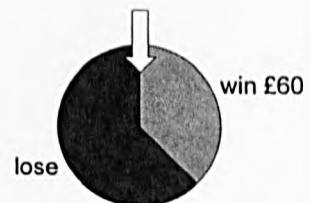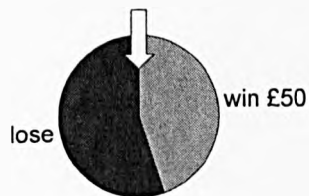
About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Gvi: Study 7 – Control 2, Dominated lure (Spinner B = Target$_L$) (one variation)

Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are three games offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on.

Choose the spinner at which you would like to spend your token (please circle the relevant spinner).

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Gvii: Study 7 – Control 3, Conflicted lure (Spinner A = Target$_L$) (one variation)

Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are three games offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on.

Choose the spinner at which you would like to spend your token (please circle the relevant spinner).
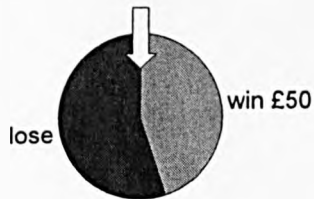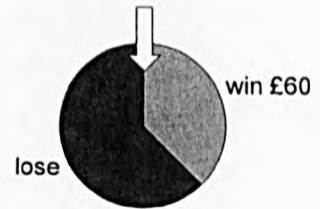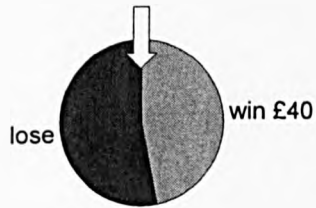
About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Gviii Study 7 – Control 4, Conflicted lure (Spinner B = Target$_L$) (one variation).

Imagine that you are at a casino. You are about to leave and you have one token left. Near the exit there are three games offering a chance of winning a prize in exchange for your token. You can get one spin of the wheel in exchange for your token, and if the pointer ends up in the light section, you win the amount specified. This is what you decide to spend your token on.

Choose the spinner at which you would like to spend your token (please circle the relevant spinner).
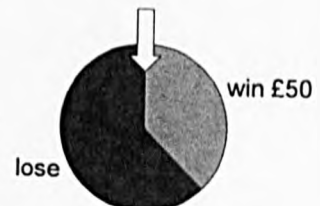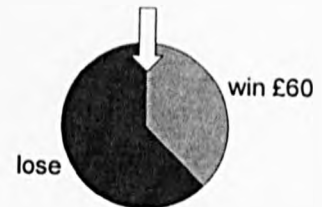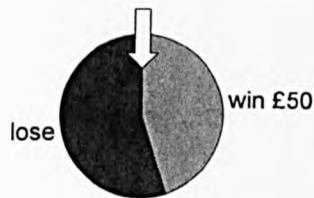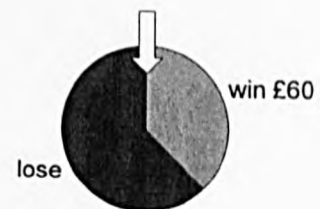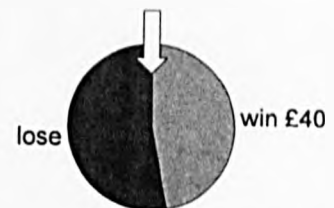

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix H: Materials for Study 8
Appendix Hi: Monty Hall – standard three door condition

Thank you for taking part in this research

All responses will be treated as confidential and

no-one will be identified in any results which are reported.

Please do not discuss the task with colleagues,

we are interested in your response to the task
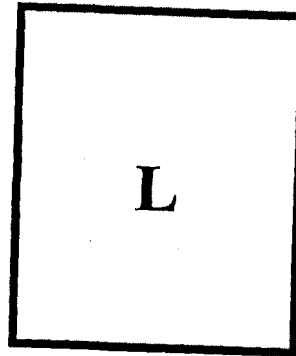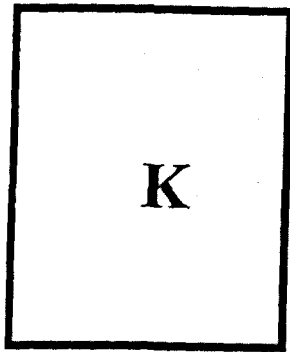
You are a contestant in the game show described. Initially you have chosen box K.

You can now (please tick your choice):

Stick with box K   ☐

Choose Box L   ☐

Some details about you:

Your age: ....

Your gender   Male   ☐

                      Female   ☐

Your degree Programme   ....

Do you have a professional/vocational qualification?

        Yes   ☐   No   ☐

        If yes, please specify: ....

Have you taken courses which covered

        Corporate finance   ☐

        Conditional probability   ☐

Appendix Hii: Study 8 – Four door Choose-A-Door Monty Hall condition.

Thank you for taking part in this research

All responses will be treated as confidential and

no-one will be identified in any results which are reported.

Please do not discuss the task with colleagues,

we are interested in your response to the task

K	L	M
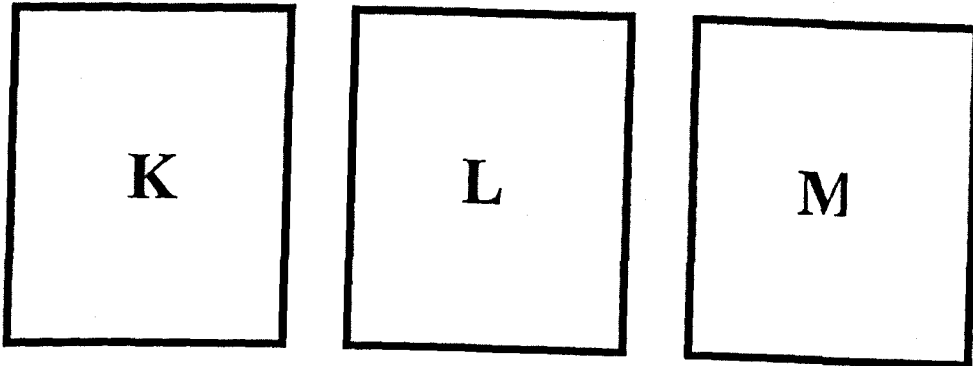
You are a contestant in the game show described. Initially you have chosen box K.

You can now (please tick your choice):

Stick with box K ☐

Choose Box L ☐

Choose Box M ☐

Some details about you:

Your age: …………..

Your gender   Male ☐

              Female ☐

Your degree Programme ……………………………………………………………….

Do you have a professional/vocational qualification?

     Yes ☐   No ☐

     If yes, please specify: …………………………..

Have you taken courses which covered

     Corporate finance ☐

     Conditional probability ☐

Appendix Hiii: Study 8 – Four door Choose-A-Choice Monty Hall condition.

Thank you for taking part in this research

All responses will be treated as confidential and

no-one will be identified in any results which are reported.

Please do not discuss the task with colleagues,

we are interested in your response to the task

| K | L | M |
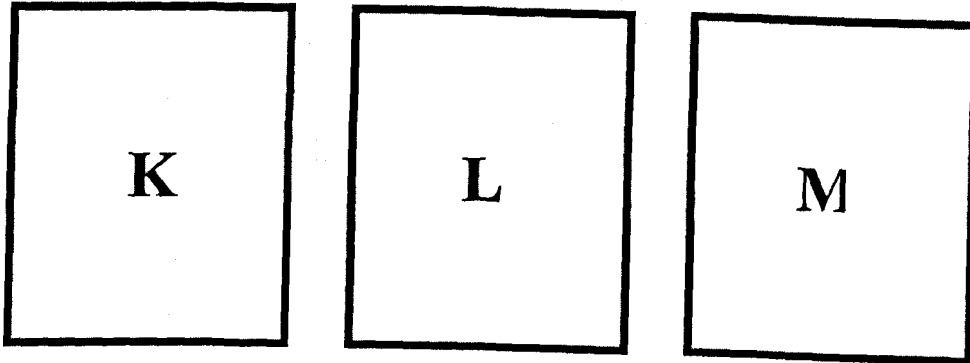
You are a contestant in the game show described. Initially you have chosen box K.

You can now (please tick your choice):

Stick with box K   ☐

Switch to Either Box L or Box M   ☐

Some details about you:

Your age: ....

Your gender   Male   ☐

               Female   ☐

Your degree Programme   ....

Do you have a professional/vocational qualification?

     Yes   ☐   No   ☐

     If yes, please specify: ....

Have you taken courses which covered

     Corporate finance   ☐

     Conditional probability   ☐

Appendix I. Materials for Study 9a and 9b.

Appendix Ii: Study 9a & 9b: Version 1

1. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

   - An Italian restaurant   ❑

   - Your choice of either a Mexican or a Thai restaurant   ❑

2. You are choosing your meal for tonight. For dessert, you can have either ice cream, or your choice of either chocolate cake, cheesecake or fruit salad. Firstly, for each of the following pairs of options, please indicate which one you prefer (please tick **one** in each pair)

   2. 1 Option pair 1

      - Chocolate cake   ❑

      - Cheesecake   ❑

   2.2 Option pair 2

      - Chocolate cake   ❑

      - Fruit salad   ❑

   2.3 Option pair 3

      - Cheesecake   ❑

      - Fruit salad   ❑

   2.4 Now indicate which of the following dessert choices you prefer.

   - Ice cream   ❑

   - Your choice of either chocolate cake, cheesecake or fruit salad ❑

About you:	Male / female
Age:	

Appendix Iii: Studies 9a and 9b – Version 2

1. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

- An Mexican restaurant   ❑
- Your choice of either an Italian or a Thai restaurant   ❑

2. You are choosing your own meal for tonight. For dessert, you can have either cheesecake, or your choice of either chocolate cake, ice cream or fruit salad. Indicate which of the following dessert choices you prefer.

- Cheesecake   ❑
- Your choice of either chocolate cake, ice cream or fruit salad   ❑

About you:	Male / female
Age:	

Appendix Iiii: Studies 9a and 9b – Version 3

1. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

   1. A Thai restaurant   ❏

   2. Your choice of either an Italian or a Mexican restaurant   ❏

2. You are choosing your meal for tonight. For dessert, you can have either cheesecake, or your choice of either chocolate cake, ice cream or fruit salad.

   Firstly, for each of the following pairs of options, please indicate which one you prefer (please tick **one** in each pair)

   2.1 Option pair 1

   - Chocolate cake   ❏
   - Ice cream   ❏

   2.2 Option pair 2

   - Chocolate cake   ❏
   - Fruit salad   ❏

   2.3 Option pair 3

   - Ice cream   ❏
   - Fruit salad   ❏

   2.4 Now indicate which of the following dessert choices you prefer.

   - Cheesecake   ❏
   - Your choice of either chocolate cake, ice cream or fruit salad   ❏

About you:	Male / female
Age:	

Appendix Iiv: Studies 9a and 9b – Version 4

1. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).
   - An Italian restaurant ❑
   - Your choice of either a Mexican, Thai, Seafood, or Indian restaurant ❑

2. You are choosing your own meal for tonight. For dessert, you can have either ice cream, or your choice of either chocolate cake, cheesecake or fruit salad. Indicate which of the following dessert choices you prefer.
   - Ice cream ❑
   - Your choice of either chocolate cake, cheesecake or fruit salad ❑

About you:	Male / female
Age:	

Appendix Iv: Studies 9a and 9b – Version 5

1. Imagine you are planning an outing for tonight, and you can choose between the
   following restaurant options. Which would you prefer? (Please tick one).

   - A Mexican restaurant   ❑

   - Your choice of either an Italian, Thai, Seafood, or Indian restaurant   ❑

2. You are choosing your own meal for tonight. For dessert, you can have either
   chocolate cake, or your choice of either ice cream, cheesecake or fruit salad. Indicate
   which of the following dessert choices you prefer.

   - Chocolate cake   ❑

   - Your choice of either ice cream, cheesecake or fruit salad   ❑

About you:	Male / female
Age:	

Appendix Ivi: Studies 9a and 9b – Version 6

1. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

   - A Thai restaurant ☐

   - Your choice of either an Italian, Mexican, Seafood, or Indian restaurant ☐

2. You are choosing your meal for tonight. For dessert, you can have either chocolate cake, or your choice of either ice cream, cheesecake or fruit salad. Firstly, for each of the following pairs of options, please indicate which one you prefer (please tick **one** in each pair)

   2. 1 Option pair 1

   - Ice cream ☐

   - Cheesecake ☐

   2.2 Option pair 2

   - Ice cream ☐

   - Fruit salad ☐

   2.3 Option pair 3

   - Cheesecake ☐

   - Fruit salad ☐

   2.4 Now indicate which of the following dessert choices you prefer.

   - Chocolate cake ☐

   - Your choice of either ice cream, cheesecake or fruit salad ☐

About you:	Male / female
Age:	

Appendix Ivii: Studies 9a and 9b – Version 7

1. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

   - A Seafood restaurant   ❏

   - Your choice of either an Italian, Mexican, Thai, or Indian restaurant   ❏

2. You are choosing your own meal for tonight. For dessert, you can have either fruit salad, or your choice of either chocolate cake, ice cream or cheesecake. Indicate which of the following dessert choices you prefer.

   - Fruit salad   ❏

   - Your choice of either chocolate cake, ice cream or cheesecake   ❏

About you:	Male / female
Age:	

Appendix Iviii: Studies 9a and 9b – Version 8

1. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).
    - An Indian restaurant ☐
    - Your choice of either an Italian, Mexican, Thai, or Seafood restaurant ☐

2. You are choosing your meal for tonight. For dessert, you can have either fruit salad, or your choice of either chocolate cake, ice cream, or cheesecake.
    Firstly, for each of the following pairs of options, please indicate which one you prefer (please tick **one** in each pair)

    2. 1 Option pair 1
    - Chocolate cake ☐
    - Ice cream ☐

    2.2 Option pair 2
    - Chocolate cake ☐
    - Cheesecake ☐

    2.3 Option pair 3
    - Ice cream ☐
    - Cheesecake ☐

    2.4 Now indicate which of the following dessert choices you prefer.
    - Fruit salad ☐
    - Your choice of either chocolate cake, ice cream or cheesecake ☐

About you:	Male / female
Age:	

Appendix J: Materials for Study 10
Appendix Ji: Study 10 – Passive condition, version 1.

The following items have been *randomly* grouped into a set of three items and a lone item. Please indicate your preference for the lone item of your choice or one of the three grouped options.

1.

- Fruit juice   ❑
- Your choice of either cola, coffee or tea   ❑

2.

- A seafood restaurant   ❑
- Your choice of either a Mexican, Italian or Thai restaurant ❑

3.

- Chicken   ❑
- Your choice of either beef, fish or pasta   ❑

4.

- Chocolate cake   ❑
- Your choice of either ice-cream, cheesecake or fruit salad ❑

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jii: Study 10 – Passive condition, version 2.

The following items have been *randomly* grouped into a set of three items and a lone item. Please indicate your preference for the lone item of your choice or one of the three grouped options.

1.

- Your choice of either cola, coffee or tea ☐
- Fruit juice ☐

2.

- Your choice of either a Mexican, Italian or Thai restaurant ☐
- A seafood restaurant ☐

3.

- Your choice of either beef, fish or pasta ☐
- Chicken · ☐

4.

- Your choice of either ice-cream, cheesecake or fruit salad ☐
- Chocolate cake ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jiii: Study 10 – Passive condition, version 3.

The following items have been *randomly* grouped into a set of three items and a lone item. Please indicate your preference for the lone item of your choice or one of the three grouped options.

1.

- Cola ☐
- Your choice of either coffee, tea or fruit juice ☐

2.

- A Mexican restaurant ☐
- Your choice of either an Italian, Thai or seafood restaurant ☐

3.

- Beef ☐
- Your choice of either fish, pasta or chicken ☐

4.

- Ice-cream ☐
- Your choice of either cheesecake, fruit salad or chocolate cake ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jiv: Study 10 – Passive condition, version 4.

The following items have been *randomly* grouped into a set of three items and a lone item. Please indicate your preference for the lone item of your choice or one of the three grouped options.

1.

- Your choice of either coffee, tea or fruit juice   ❏
- Cola   ❏

2.

- Your choice of either an Italian, Thai or seafood restaurant   ❏
- A Mexican restaurant   ❏

3.

- Your choice of either fish, pasta or chicken   ❏
- Beef   ❏

4.

- Your choice of either cheesecake, fruit salad or chocolate cake   ❏
- Ice-cream   ❏

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jv: Study 10 – Passive condition, version 5.

The following items have been *randomly* grouped into a set of three items and a lone item. Please indicate your preference for the lone item of your choice or one of the three grouped options.

1.

- Coffee ☐
- Your choice of either tea, fruit juice or cola ☐

2.

- An Italian restaurant ☐
- Your choice of either a Thai, seafood or Mexican restaurant ☐

3.

- Fish ☐
- Your choice of either pasta, chicken or beef ☐

4.

- Cheesecake ☐
- Your choice of either fruit salad, chocolate cake or ice-cream ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jvi: Study 10 – Passive condition, version 6.

The following items have been *randomly* grouped into a set of three items and a lone item. Please indicate your preference for the lone item of your choice or one of the three grouped options.

1.

- Your choice of either tea, fruit juice or cola ☐
- Coffee ☐

2.

- Your choice of either a Thai, seafood or Mexican restaurant ☐
- An Italian restaurant ☐

3.

- Your choice of either pasta, chicken or beef ☐
- Fish ☐

4.

- Your choice of either fruit salad, chocolate cake or ice-cream ☐
- Cheesecake ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jvii: Study 10 – Passive condition, version 7.

The following items have been *randomly* grouped into a set of three items and a lone item. Please indicate your preference for the lone item of your choice or one of the three grouped options.

1.
- Tea ☐
- Your choice of either fruit juice, cola or coffee ☐

2.
- A Thai restaurant ☐
- Your choice of either a seafood, Mexican or Italian restaurant ☐

3.
- Pasta ☐
- Your choice of either chicken, beef or fish ☐

4.
- Fruit salad ☐
- Your choice of either chocolate cake, ice-cream or cheesecake ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jviii: Study 10 – Passive condition, version 8.

The following items have been *randomly* grouped into a set of three items and a lone item. Please indicate your preference for the lone item of your choice or one of the three grouped options.

1.

- Your choice of either fruit juice, cola or coffee ☐
- Tea ☐

2.

- Your choice of either a seafood, Mexican or Italian restaurant ☐
- A Thai restaurant ☐

3.

- Your choice of either chicken, beef or fish ☐
- Pasta ☐

4.

- Your choice of either chocolate cake, ice-cream or cheesecake ☐
- Fruit salad ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jix: Study 10 – Active condition, version 1.

1. Imagine you have stopped for a drink at a local café and you can choose between the following options. Which would you prefer? (Please tick one).

- Fruit juice   ❑
- Your choice of either cola, coffee or tea   ❑

2. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

- A seafood restaurant   ❑
- Your choice of either a Mexican, Italian or Thai restaurant ❑

3. You are choosing your main course for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Chicken   ❑
- Your choice of either beef, fish or pasta   ❑

4. You are choosing your dessert for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Chocolate cake   ❑
- Your choice of either ice-cream, cheesecake or fruit salad ❑

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jx: Study 10 – Active condition, version 2.

1. Imagine you have stopped for a drink at a local café and you can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either cola, coffee or tea   ❑
- Fruit juice   ❑

2. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

- Your choice of either a Mexican, Italian or Thai restaurant   ❑
- A seafood restaurant   ❑

3. You are choosing your main course for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either beef, fish or pasta   ❑
- Chicken   ❑

4. You are choosing your dessert for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either ice-cream, cheesecake or fruit salad   ❑
- Chocolate cake   ❑

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jxi: Study 10 – Active condition, version 3.

1. Imagine you have stopped for a drink at a local café and you can choose between the following options. Which would you prefer? (Please tick one).

- Cola ☐
- Your choice of either coffee, tea or fruit juice ☐

2. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

- A Mexican restaurant ☐
- Your choice of either an Italian, Thai or seafood restaurant ☐

3. You are choosing your main course for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Beef ☐
- Your choice of either fish, pasta or chicken ☐

4. You are choosing your dessert for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Ice-cream ☐
- Your choice of either cheesecake, fruit salad or chocolate cake ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jxii: Study 10 – Active condition, version 4.

1. Imagine you have stopped for a drink at a local café and you can choose between the following options. Which would you prefer? (Please tick one).
- Your choice of either coffee, tea or fruit juice ☐
- Cola ☐

2. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).
- Your choice of either an Italian, Thai or seafood restaurant ☐
- A Mexican restaurant ☐

3. You are choosing your main course for tonight and can choose between the following options. Which would you prefer? (Please tick one).
- Your choice of either fish, pasta or chicken ☐
- Beef ☐

4. You are choosing your dessert for tonight and can choose between the following options. Which would you prefer? (Please tick one).
- Your choice of either cheesecake, fruit salad or chocolate cake ☐
- Ice-cream ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jxiii: Study 10 – Active condition, version 5.

1. Imagine you have stopped for a drink at a local café and you can choose between the following options. Which would you prefer? (Please tick one).

- Coffee ☐
- Your choice of either tea, fruit juice or cola ☐

2. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

- An Italian restaurant ☐
- Your choice of either a Thai, seafood or Mexican restaurant ☐

3. You are choosing your main course for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Fish ☐
- Your choice of either pasta, chicken or beef ☐

4. You are choosing your dessert for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Cheesecake ☐
- Your choice of either fruit salad, chocolate cake or ice-cream ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jxiv: Study 10 – Active condition, version 6.

1. Imagine you have stopped for a drink at a local café and you can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either tea, fruit juice or cola ☐
- Coffee ☐

2. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

- Your choice of either a Thai, seafood or Mexican restaurant ☐
- An Italian restaurant ☐

3. You are choosing your main course for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either pasta, chicken or beef ☐
- Fish ☐

4. You are choosing your dessert for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either fruit salad, chocolate cake or ice-cream ☐
- Cheesecake ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jxv: Study 10 – Active condition, version 7.

1. Imagine you have stopped for a drink at a local café and you can choose between the following options. Which would you prefer? (Please tick one).

- Tea ☐
- Your choice of either fruit juice, cola or coffee ☐

2. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

- A Thai restaurant ☐
- Your choice of either a seafood, Mexican or Italian restaurant ☐

3. You are choosing your main course for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Pasta ☐
- Your choice of either chicken, beef or fish ☐

4. You are choosing your dessert for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Fruit salad ☐
- Your choice of either chocolate cake, ice-cream or cheesecake ☐

About you:	Male / female
Age:	

Many thanks for your participation.

Appendix Jxvi: Study 10 – Active condition, version 8.

1. Imagine you have stopped for a drink at a local café and you can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either fruit juice, cola or coffee ☐
- Tea ☐

2. Imagine you are planning an outing for tonight, and you can choose between the following restaurant options. Which would you prefer? (Please tick one).

- Your choice of either a seafood, Mexican or Italian restaurant ☐
- A Thai restaurant ☐

3. You are choosing your main course for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either chicken, beef or fish ☐
- Pasta ☐

4. You are choosing your dessert for tonight and can choose between the following options. Which would you prefer? (Please tick one).

- Your choice of either chocolate cake, ice-cream or cheesecake ☐
- Fruit salad ☐

About you:	Male / female
Age:	

Appendix K: Table of thesis hypotheses

Study	Hypothesis	Accepted/ rejected
1	H_{o1} (null hypothesis): the proportion of participants selecting the sure thing in the no choice condition will be equivalent to the proportion selecting the sure thing in the choice condition.	rejected
1	H_{1i} (effect of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be different to the proportion selecting sure thing in the dominated-choice and conflicted-choice conditions.	accepted
1	H_{1ii} (lure of choice hypothesis): the proportion of participants selecting the sure thing in the no- choice condition will be greater than the proportion selecting sure thing in the choice condition.	accepted
2	H_{2i} (lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting sure thing in the dominated-choice and conflicted-choice conditions.	accepted
2	H_{2ii} (conflicted lure of choice hypothesis): the proportion of participants selecting the sure thing in the dominated-choice condition will be greater than the proportion selecting the sure thing in the conflicted-choice condition.	rejected
3	H_{3i} (dominated lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting the sure thing in the dominated-choice condition.	accepted
3	H_{3ii} (conflicted lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting sure thing in the conflicted-choice condition.	accepted
4	H_{4i} (high-contrast lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting sure thing in the high contrast-choice condition.	accepted
4	H_{4ii} (low-contrast lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting sure thing in the low contrast-choice condition.	accepted
4	H_{4iii} (three-choice lure of choice hypothesis): the proportion of participants selecting the sure thing in the no-choice condition will be greater than the proportion selecting sure thing in the three-choice condition.	rejected
4	H_{4iv} (contrast-determined lure of choice hypothesis): the proportion of participants selecting the sure thing will	rejected

Study	Hypothesis	Accepted/ rejected
	be less in the high-contrast condition than in the low-contrast condition.	
4	H_{4v} (option summing-determined lure of choice hypotheses): the proportion of participants selecting the sure thing will be less in the three-choice condition than the in the low-contrast condition	rejected
4	H_{4vi} (option summing-determined lure of choice hypotheses): the proportion of participants selecting the sure thing will be less in the low-contrast choice condition than the in the high-contrast condition.	rejected
4	H_{4vii} (number of options-generated lure of choice hypothesis): the proportion of participants selecting the sure thing in the three-choice condition will be less than in any of the two choice conditions.	rejected
5	$H5_i$ (asymmetric dominance effect hypothesis): The presence of Club Atom will correspond with a preference for Club Diesel both in Condition 1 and Condition 2.	rejected
5	$H5_{ii}$ (lure of choice hypothesis): The presence of Club Atom will correspond with a preference for T_L (Club Diesel in Condition 1, and Club Cherish in Condition 2).	accepted
6	$H6_i$ (asymmetric dominance effect hypothesis): The presence of Account 3 will correspond with a preference for Account 1, regardless of which target it is paired with.	rejected
6	$H6_{ii}$ (lure of choice hypothesis): The presence of Account 3 will correspond with a preference for T_L (i.e. whichever account it is paired with in that condition).	accepted
7	$H7_i$ (dominated lure of choice hypothesis): The presence of Spinner D (dominated lure) will correspond with a preference for T_L (i.e. whichever account it is paired with in a given condition).	rejected
7	H7ii (conflicted lure of hypothesis): The presence of Spinner C (conflicted lure) will correspond with a preference for T_L (i.e. whichever account it is paired with in a given condition).	accepted
7	$H7_{iii}$ (asymmetric dominance effect hypothesis): The presence of Spinner C (conflicted lure) will correspond with a preference for Spinner A (regardless of which account it is paired with it).	rejected
7	$H7_{iv}$ (physical proximity versus explicit pairing hypothesis): The preference reversal known as the lure of choice will only be demonstrated when the floating lure (Spinner D or C) is explicitly paired with T_L, and not when the physical proximity is the same, but with no explicit pairing (control conditions).	accepted
8	H8i (the Monty hypothesis): The majority of people will stick to Box K in the three-door, CAD and CAC conditions.	rejected

Study	Hypothesis	Accepted/ rejected
8	H8$_{ii}$ (lure of choice hypothesis): More people will switch in the CAC condition than in the CAD condition.	accepted
9a	H9$_i$ (basic comparisons-hurt hypothesis): lone option sum for control condition of Study 9a will be > 100%.	rejected
9a	H9$_{ii}$ (basic lure of choice hypothesis): lone option sum for control condition of Study 9a will be < 100%.	accepted
9a	H9$_{iii}$ (explicit comparisons-hurt hypothesis): lone option sum for forced-comparisons condition of Study 9a will be > 100%, and greater than lone sum option for control condition of Study 9a.	rejected
9a	H9$_{iv}$ (forced-comparisons lure of choice hypothesis): lone option sum for forced-comparisons condition of Study 9a will be < 100%.	rejected
9b	H9$_v$ (weak comparisons-hurt hypothesis): lone option sum for three-choice and five-choice conditions of Study 9b will be > 100%.	rejected
9b	H9$_{vi}$ (strong comparisons-hurt hypothesis): lone option sum for five-choice condition of Study 9b will be > 100% and > lone option sum for five-choice condition of Study 9b.	rejected
9b	H9$_{vii}$ (weak lure of choice hypothesis): lone option sum for three-choice and five-choice conditions of Study 9b will be < 100%.	accepted
9b	H9$_{viii}$ (strong lure of choice hypothesis): lone option sum for five-choice condition of Study 9b will be < 100% and < lone option sum for three-choice condition of Study 9b.	accepted
10	H10$_i$ (passive decision hypothesis): when the options are grouped randomly, the comparisons-hurt explanation predicts a lone option sum for the passive condition to be > 100%.	accepted
10	H10$_{ii}$ (active decision hypothesis): when the options are described in terms of a brief scenario, the lure of choice explanation predicts a lone option sum for the active condition to be < 100%.	accepted

Appendix L

Multi-dimensional versus unitary lure potential follow-up study.

In a floating lure study, designed to investigate parametric differences between unitary lures and multi-dimensional lures described using the criteria detailed in Table 17, there are 28 different possible versions. These vary in terms of which target item was paired with the lure, i.e. played the role of $target_L$ (two levels: $target_1$ or $target_2$), which type of lure was paired with it (seven levels: unitary lure, $lure_1$, $lure_2$, $lure_3$, $lure_4$, $lure_5$ or $lure_6$) and the order of the choices (two levels: $target_L$ and lure presented first followed by $target_1$, or $target_1$ followed by $target_L$ and lure). The table below clarifies all choice pairings for one example. Item notation: number denotes scenario, letter denotes type of lure and paring of lure, and i/ii denotes presentation order.

Presented first	Presented second	Item
Unitary Lure		
$Target_1$ or lure	$Target_2$	1Ai
$Target_2$	$Target_1$ or lure	1Aii
$Target_2$ or lure	$Target_1$	1Bi
$Target_1$	$Target_2$ or lure	1Bii
Multi-attribute Lures		
$Target_1$ or $lure_1$	$Target_2$	1Ci
$Target_2$	$Target_1$ or $lure_1$	1Cii
$Target_2$ or $lure_1$	$Target_1$	1Di
$Target_1$	$Target_2$ or $lure_1$	1Dii
$Target_1$ or $lure_2$	$Target_2$	1Ei
$Target_2$	$Target_1$ or $lure_2$	1Eii
$Target_2$ or $lure_2$	$Target_1$	1Fi
$Target_1$	$Target_2$ or $lure_2$	1Fii
$Target_1$ or $lure_3$	$Target_2$	1Gi
$Target_2$	$Target_1$ or $lure_3$	1Gii
$Target_2$ or $lure_3$	$Target_1$	1Hi
$Target_1$	$Target_2$ or $lure_3$	1Hii
$Target_1$ or $lure_4$	$Target_2$	1Iii
$Target_2$	$Target_1$ or $lure_4$	1Iii
$Target_2$ or $lure_4$	$Target_1$	1Ji
$Target_1$	$Target_2$ or $lure_4$	1Jii
$Target_1$ or $lure_5$	$Target_2$	1Ki
$Target_2$	$Target_1$ or $lure_5$	1Kii
$Target_2$ or $lure_5$	$Target_1$	1Li
$Target_1$	$Target_2$ or $lure_5$	1Lii
$Target_1$ or $lure_6$	$Target_2$	1Mi
$Target_2$	$Target_1$ or $lure_6$	1Mii
$Target_2$ or $lure_6$	$Target_1$	1Ni
$Target_1$	$Target_2$ or $lure_6$	1Nii