Clinician-client interactions in MET: The effect of clinicians' utterances on client commitment talk

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

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ABSTRACT

Motivational Interviewing is an effective treatment for a range of problematic behaviours. However, previous studies have revealed substantial variability in the effectiveness of clinicians. Curiously, the specific clinician behaviours which contribute to positive outcomes have rarely been studied. Previous studies have often focused on the impact of broad categories of clinician behaviour on outcomes; such outcomes have often been overt client behaviours. The current study represented a substantial shift from the dominant methodologies in the MI literature. It aimed to study the effect specific clinician behaviours had upon client's preparatory talk and strong commitment talk, in the second-to-second interactions between clinicians and clients.

A secondary analysis of Motivational Enhancement Therapy sessions was conducted, using recordings obtained during the United Kingdom Alcohol Treatment Trial (UKATT). Recordings were sampled from those clients who achieved and maintained positive changes in readiness to change following the UKATT study. Recordings were parsed and coded, with data being subjected to sequential and regression analyses.

The findings revealed that clinicians' complex reflections were associated with, and predictive of, significantly more strong commitments from clients. Open questions and complex reflections were both associated with significantly more preparatory talk. However, only complex reflections acted as a significant predictor of preparatory talk.

It is concluded that complex reflections and open questions are necessary for the proficient practice of MI, and that clinicians should tailor their approach to match their client's current motivational state. Moreover, the effectiveness of MI is likely attributable to a combination of the 'spirit' of MI and the proficient use of such skills, and possibly other specific skills. It is proposed that future research into MI and other psychological therapies should investigate the role of complex reflections, open questions and other specific clinician behaviours on client outcomes of interest.

Contents

ACKNOWLEDGEMENTS 3
ABSTRACT 4
LIST OF TABLES 7
LIST OF FIGURES 9
ABBREVIATIONS 10
Introduction 12
Aim 12
Literature Review 12
Change Processes in Psychological Therapy 12
Introduction to Motivational Interviewing 14
The History of MI 15
The Theory of MI 17
The Evolution of Motivational Enhancement Therapy 20
Effectiveness of MI, MET and adapted MI interventions 21
Stage of Change Transition, MI and Client Outcomes 24
Why does MI work: Part 1- Coding frameworks and definitions of types of talk 26
Why does MI work: Part 2- Client talk and outcomes 28
Why does MI work: Part 3- Clinician Behaviour 35
MI Practices and Client Change Talk 35
Clinician-client interactions and client outcomes 37
Why does MI work: Part 4- Therapist Variability in Outcomes 44
Summary 45
Research Question 46
Hypotheses 46
Method 47
Overview & Context 47
Participant & Data Selection 47
Participant Selection Pilot 47
Possible Amendments to Participant Selection 49
Sample Representativeness 50
Data analysis 50
CASAA Application for Coding Treatment Interactions (CACTI) 50
Amendments to CACTI 51
Selecting categories of client and clinician talk for sequential analyses 58
Analyses completed 58
Sample size and the power of the analyses 61
The power of sequential analyses 61
The power of linear regression analyses 62
Parsing, Coding & Reliability 64
Training of the Second Coder 64
Inter-Rater Reliability 64
Establishing Inter-rater reliability 65
Rater Drift 65
Reflections on the process of establishing inter-rater reliability 66
Ethics 69
Results 70
Amendments to Recording Selection 70
Amendments to Participant Selection 71

Preliminary Analyses 72
Collapsing Categories 73
Clinician Categories 73
Client Categories 75
Inter-rater reliability 76
Establishing Inter-rater reliability 76
Rater drift 79
Descriptive Statistics 81
Research Aim & Hypotheses Revisited 83
Sequential Analysis 83
Regression Analysis 87
Further Analyses 88
Discussion 91
Research context of this study 91
Discussion of the research aim and hypotheses in light of the MI and wider literature 92
How are commitment utterances evoked by clinicians? 92
How were other types of client talk evoked? 96
How do these findings inform the clinical practice and research of MI? 99
How do these findings inform the practice of other psychological therapies? 104
Strengths and limitations of the current study 105
Study Design 105
Study Sample 108
Considerations for future research 111
Summary and Conclusions 114
References 116
Appendices 129
Appendix A- Readiness to change (treatment version) questionnaire 129
Appendix B- Tables of expected frequencies for lag one and lag two 130
Appendix C- Tables of actual joint frequencies for lag one and lag two 131
Appendix D- Histogram illustrating the distribution of the residuals (strong commitment regression analysis) 132
Appendix E- Probability-probability (P-P) plot of expected and observed values (strong commitment regression analysis) 133
Appendix F- Scatterplot of standardised residuals against standardised predicted values (strong commitment regression analysis) 134
Appendix G- Histogram illustrating the distribution of the residuals (preparatory talk regression analysis) 135
Appendix H- Probability-probability (P-P) plot of expected and observed values (preparatory talk regression analysis) 136
Appendix I- Scatterplot of standardised residuals against standardised predicted values (preparatory talk regression analysis) 137

LIST OF TABLES

Table 1: A summary of coding frameworks for MI sessions……..28

Table 2: A summary of research investigating client talk and outcomes……...33

Table 3: A summary of research investigating clinician behaviours in MI……40

Table 4: Clinician and client categories from the MI-SCOPE (Martin et al, 2005), and how they were adapted for the current study…….……..56

Table 5: Clinician categories created from the collapsing of sub-categories, as defined in the MI-SCOPE (Martin et al, 2005)…….**....**75

Table 6: Client categories created from the collapsing of sub-categories, as defined in the MI-SCOPE (Martin et al, 2005)…….…76

Table 7: Intra-class correlations for code frequencies and transition frequencies; first inter-rater analysis……....77

Table 8: Intra-class correlations for code frequencies and transition frequencies; second inter-rater analysis…….……...…78

Table 9: Intra-class correlations for code frequencies and transition frequencies; third inter-rater analysis……..…..79

Table 10: Intra-class correlations for code frequencies and transition frequencies……...…….81

Table 11: Descriptive statistics for collapsed clinician categories, pooling data across all sessions……...….81

Table 12: Descriptive statistics for collapsed client categories, pooling data across all sessions……...…..82

Table 13: Transitional probabilities between clinician and client codes at lag one……84

Table 14: Transitional probabilities between clinician and client codes at lag two…….…...85

Table 15: Logistic regression of MICO behaviour, simple reflections, complex reflections, closed questions and open questions on to client strong commitment utterances……..……88

Table 16: Logistic regression of complex reflections and open questions on to client preparatory utterances…….…….90

LIST OF FIGURES

Figure 1: A flowchart of participant inclusion criteria for the current study…….….49

Figure 2: The distinction between lag one and lag two contingencies in sequential data……..…….60

Figure 3: Updated flowchart of participant included in the current study……..…72

ABBREVIATIONS

BMI- Brief Motivational Intervention

BPS: British Psychological Society

CACTI- CASAA Application for Coding Treatment Interactions

CBT- Cognitive-Behaviour Therapy

CCT- Counter-Change Talk

CI- Confidence Interval

CQ- Closed Question

CREF- Complex Reflection

CT- Change Talk

DCU- Drinkers Check-Up

F- F Value

F/A- Follow/Neutral or Ask

GGT- Y- glutamyl transferase

GSEQ- Generalized Sequential Querier

HIV- Human Immunodeficiency Virus

ICC- Intraclass Correlation Co-efficient

MET- Motivational Enhancement Therapy

MI- Motivational Interviewing

MICO- Motivational Interviewing Consistent

MIIN- Motivational Interviewing Inconsistent

MISC- Motivational Interviewing Skill Code

MI-SCOPE- Motivational Interviewing Sequential Code for Observing Process Exchanges

MITI- Motivational Interviewing Treatment Integrity Code

NEUTRAL- Neutral Talk

NHS- National Health Service

OQ- Open Question

PREP- Preparatory Talk

P-P - Probability-Probability Plot

RCT- Randomised Control Trial

RCQ- Readiness to Change Questionnaire

SCOM- Strong Commitment

SCS- Single Case Study

SPSS- Statistical Package for the Social Sciences

SREF- Simple Reflection

SUST- Sustain Talk

TTM- Trans-Theoretical Model

UKATT- United Kingdom Alcohol Treatment Trial

URICA- University of Rhode Island Change Assessment

WAVE- Wav

WCOM- Weak Commitment

Introduction

Aim

The aim of this research was to investigate the role that specific clinician behaviours may have had in eliciting strong client commitment talk and client preparatory talk. This research used digital recordings of Motivational Enhancement Therapy (MET) sessions following which clients reported positive attitude change. The sessions were recorded during the United Kingdom Alcohol Treatment Trial (UKATT). Coded data from these recordings was analysed to determine clinician behaviours associated with, and predictive of strong client commitment talk and client preparatory talk. The extent to which such findings inform future clinical practice and research in MI and other psychological therapies will be discussed.

Literature Review

Change Processes in Psychological Therapy

The need to identify, describe and explain the processes which cause change during psychological therapy has been well known for many years (Elliot, 2010). Research investigating this area, known as change process research, is a crucial addition to randomised control trials (RCTs) and single case studies (SCSs). Change process research, unlike RCTs and SCSs, does not merely seek to demonstrate the existence of a causal and/or correlational relationship between client's outcomes and the provision of therapy (Elliot, 2010). Instead, change process research seeks to provide a logical, theoretically grounded narrative which explains the reliable occurrence of such changes, and is therefore a necessary addition to outcome focused research. Such research can take the form of using qualitative methods to investigate what aspects of a psychological therapy clients found helpful, the micro-analysis of sequences of behaviour between client and clinician, or the analysis of events which are

hypothesised to be significant in the process of change (Elliot, 2010; Greenberg, 1986).

Discussing the possible causes of change during psychological therapy, Messer and Wampold (2002) highlight the tension in the literature between two opposing models of change. These models are the specific factors model of change (otherwise referred to as the medical model of psychological therapy) and the common factors model of change. The former of these approaches proposes that certain crucial ingredients are responsible for the positive change seen following psychological therapies, and that certain treatments contain specific ingredients unique to them, which cause them to be effective in addressing particular difficulties. Therefore, it is the delivery (or not) of these ingredients as part of an intervention which is crucial to its success (Messer & Wampold, 2002).

The latter of these approaches proposes that factors common to all successful psychological therapies, such as the therapeutic alliance and clinician's skill in delivering a therapy, are responsible for the success of psychological therapies (Messer & Wampold, 2002). Therefore, one would not expect to see significant differences between the outcomes of specific psychological therapies. To test this approach, Luborksy, Rosenthal, Diguer et al (2002) meta-analysed data from 17 meta-analyses which directly compared the effectiveness of psychological therapies. They found a statistically insignificant effect size of .20. Messer and Wampold (2002) emphasise that this result is consistent with previous findings, including that of Grissom (1996), who meta-analysed the data of 32 previous meta-analyses comparing psychological therapies, and found an effect size of .23. Messer and Wampold (2002) suggest that these findings provide clear evidence for the common factors theory of change during psychological therapy.

However, despite the availability of change process research methods to investigate common factors, there is a general tendency for such research to occur retrospectively (Morley & Keefe, 2007). This is likely an artefact of the way psychological therapies are often developed. Specifically, through applying clinical observations and theory to create new and helpful means of addressing client's problems, with a view to establishing mechanisms of change afterward. In addition, as Garfield (1990) states, it is important to firstly establish the effectiveness of a psychological therapy before investigating the processes responsible for its effectiveness. The net result of this has been a relative dearth of understanding about the factors which cause the changes established psychological therapies produce.

Compounding this problem further is the fact that there has been a wealth of research in the psychological therapy literature which has used correlational methods (Garfield, 1990; Lambert, 2004). Whilst this has been helpful in highlighting the effectiveness of psychological therapies, and possible process factors worthy of further investigation, it has provided little information about causal mechanisms of change. For example, in the field of motivational interviewing, researchers have consistently highlighted the need to investigate the processes involved in changing client's behaviour (see Miller & Rose, 2009).

Introduction to Motivational Interviewing

In a wide variety of settings- in everyday life and in health consultations- individuals and health professionals have conversations about change (Miller & Rollnick, 2013). These conversations may be thought of lying on a continuum; a "directive style" emphasising instruction and advice from an 'expert' lying at one end, and a "following style" characterised by one individual's interest in understanding the difficulties of another, lying at the other. These different approaches imply distinct sets of assumptions about the nature of the interaction taking place, and the roles individuals assume within it. In the directive style, one individual is assumed to hold specialist knowledge on how another individual ought to go about changing their behaviour, and provides information on how to achieve it (Miller & Rollnick, 2013). In the following style, the capacity to change is assumed to reside within the individual, with no outsider guidance or instruction being provided to help achieve it.

Traditionally, clinicians have favoured a directive, advice giving approach (Britt, Hudson & Blampied, 2004), with recent reforms to the National Health Service (NHS) continuing to emphasise the worth of this approach, by encouraging clinicians to make 'every contact count' through providing advice at each health consultation (NHS Future Forum, 2012). The common assumption of advice giving is that providing knowledge is sufficient to enable the individual to change an unhelpful behaviour in the desired direction (Rollnick, Kinnersley & Stott, 1993). However, previous investigations have yielded poor support for the efficacy of advice giving (Britt, Hudson & Blampied, 2004; Rubak, Sandbaek, Lauritzen et al, 2005). Moreover, health professionals have voiced concerns about its potentially damaging effect upon their relationships with patients (Lawlor, Keen & Neal, 2000).

Despite the extensive use of directive approaches in health settings, difficulty helping individuals make positive changes is a frequent challenge for clinicians (Miller & Rollnick, 2013). Indeed, any individual wishing to help others change will find that people are rarely ready and willing to do so (Hettema, Steele & Miller, 2005). An approach which seeks to increase this readiness and willingness to change, in the service of promoting behaviour change, is motivational interviewing (MI). MI is a client-centred, directive intervention, which seeks to promote change through amplifying and resolving ambivalence to that change (Rollnick & Miller, 1995). Originally outlined by William Miller (1983), MI does not seek to adopt the expert-patient relationship emphasised within advice giving approaches (Rollnick, Kinnersley & Stott, 1993). Instead, MI is identified as an approach which emphasises the creation of a collaborative relationship with the individual, within which their autonomy is respected and promoted (Miller). As such, MI occupies the mid point on the continuum between "directive" and "following" approaches, utilising aspects of both styles to produce favourable outcomes (Miller & Rollnick, 2013). For example, as well as emphasising the importance of collaboration and the individual's autonomy, MI incorporates specific strategies to promote change, such as developing discrepancy between the individual's current behaviour and their values and/or goals.

The History of MI

Prior to the first publication detailing a coherent overview of MI practice and theory (Miller, 1983), addiction treatment had recently emerged from a questionable period in its history. In the mid 20th century, a school of thought began to emerge within voluntary peer support communities which emphasised a confrontational, hard hitting approach to the treatment of individuals seeking help for addiction problems (Miller, Benefield & Tonigan, 1993; White & Miller, 2007). Many clinicians within addiction services (particularly those in the United States), began to support and adopt a confrontational model of treatment. Forrest (1982) defined this form of confrontational treatment as direct, reality focused feedback to the client regarding their drinking behaviour, beliefs and feelings. This confrontational treatment varied in its nature and intensity, from concise (albeit blunt) feedback regarding the client's current difficulties, to intense argument and even intentional embarrassment of the client in a group setting (White & Miller, 2007).

At the heart of this approach lay the assumption that individuals suffering with addiction problems had developed elaborate defence mechanisms such as denial, which prevented accurate self-awareness and reflection (Tiebout, 1953; 1961). The intention of these treatment approaches was to overwhelm such defence mechanisms, paving the way for positive change (Miller, Benefield & Tonigan, 1993). Within this framework, treatment failures were often ascribed to the flawed personality of the addicted individual, who would likely be viewed as someone who had not reached the necessary 'rock bottom' to allow them to effectively engage in treatment. This attribution style favours the clinician and is often detrimental to the client; treatment successes are attributed to the clinician or 'programme' of treatment, whilst failures are attributed to the client's flawed psyche, or negative personality traits (Miller, 1983; Tiebout, 1953; 1961; White & Miller, 2007). However, despite its popularity, empirical investigations have shown such an approach to be ineffective and potentially harmful (Miller, Benefield & Tonigan, 1993; Sannibale, 1989).

In a seminal paper, Miller (1983) provided a robust critique of the confrontational approach, and outlined an alternate approach to the treatment of addiction, influenced by a diverse range of social psychology theory and humanistic approaches. An earlier study conducted by Miller, Taylor & West (1980) highlighted the unexpected effect of clinician-client interactions upon outcomes. Within this study, the central aim was to investigate the effectiveness of 'focused' (i.e. focusing purely upon the individual's problem drinking) versus 'broad-spectrum' treatment (i.e. focusing upon areas of difficulty in the person's life felt to be associated with drinking), in helping clients to reduce their drinking and learn moderation. The findings of this study demonstrated that the extent to which therapists showed 'accurate empathy' predicted 67% of the variance in client drinking behaviour at 6-8 month follow-up. Furthermore, longer term follow-ups demonstrated that accurate empathy continued to predict 50% and 25% of the variance in outcomes at 12 and 24 months respectively (Miller, Taylor & West, 1980).

It was following such findings, and when on sabbatical in Norway, that Miller met with a group of psychologists who requested that he participate in role plays, simulating how he would respond in interactions with clients in session (Miller & Rose, 2009). It was through this process that Miller verbalised what was previously an internalised model of clinical practice. This model drew upon established theories within social psychology, as well as from humanistic psychology (Miller, 1983).

The Theory of MI

Within this model, the previous notion of denial as a client variable was replaced with an alternate view; that denial and difficulties with motivation arise from the interpersonal processes between clinicians and clients. It is here that MI calls upon the principles of humanistic psychology; specifically the person centred counselling practices originally proposed by Rogers (1957; 1959).

Rogers proposed the existence of the 'core conditions' within psychotherapy, arguing that the creation and maintenance of these six conditions over a set time period would be sufficient to foster positive personality change (Rogers, 1957). More specifically, Rogers proposed that the clinician should experience and convey unconditional positive regard for the client, accurate empathy, and congruence with oneself to the client. These conditions, fostering acceptance of the client 'as they are' (Fromm, 1956), were felt to create the appropriate climate for the individual to change (Miller & Rollnick, 2013). A key point however, was that in conveying these core conditions to establish the climate for change, the person-centred clinician should respect and promote the client's autonomy to make decisions about change (Rogers, 1962). This respect for autonomy stemmed from the belief that the client naturally aspires toward a positive end state, much like the principle of self-actualisation (Maslow, 1943; Miller & Rollnick, 2013). This nurturing context, in which autonomy is promoted, was felt to offer an ideal environment within which people could openly discuss their ambivalence toward change (Miller & Rose, 2009).

The concept of ambivalence is described by Miller & Rollnick (2013) as the experience of conflicting motivations, with the individual aspiring to move both toward and away from behaviour change simultaneously. For example, a person may wish to reduce the amount of alcohol they consume, citing health concerns and financial benefits as reasons for change. However, they may also enjoy the experience of drinking alcohol and 'who they become' when they consume it, and so are experiencing a drive toward and away from behaviour change simultaneously. This concept of ambivalence can be traced back to the social psychology theory of cognitive dissonance (Festinger, 1957; Miller, 1983).

Festinger proposed that if an individual were to hold two cognitions simultaneously which are inconsistent with one another, then they would experience a negative psychological state, termed dissonance, much like those experienced when one is physically hungry or thirsty (Aronson, 1997; Festinger, 1957). This

psychological state, by virtue of it being experienced as unpleasant by the individual, acts as a driving force which prompts the individual to try and reduce it. This is typically achieved by the individual altering one or both of the dissonant cognitions, so that they become more consistent with one another. In an extension of cognitive dissonance theory, Aronson (1960) proposed that one's experience of dissonance is greatest when one behaves in a manner which contradicts one's beliefs about the self. It is proposed that this greater sense of dissonance occurs as individuals try to maintain a moral, stable and competent sense of self (Aronson, 1968; Aronson, Chase, Helmreich et al, 1974). As such, behaviour which is felt to be surprising, immoral or incompetent as compared to beliefs about the self, motivates the individual to behave in a manner which reduces the experience of dissonance. The role of the clinician in MI is to increase this experience of dissonance, by facilitating the exploration of arguments for change (Miller, 1983).

Miller & Rollnick (1991; 2002) however, later amended their theoretical assumptions, proposing that it is not the experience of dissonance which is key to behaviour change (Mylvaganam, 2009). Instead, it was proposed that the magnitude of the discrepancy between an individual's current values and/or goals and his/her behaviour, affects the importance placed on changing that behaviour. The greater the discrepancy, the more important it is. This elevated discrepancy is proposed to increase the ambivalence an individual experiences, which may then be resolved via behaviour change. This altered theoretical position signalled a move towards ambivalence, as opposed to dissonance, as the important variable in discussing and facilitating change (Mylvaganam, 2009).

MI recognises a potential risk in amplifying one's experience of ambivalence, in that to do so through directive means may in fact, have the opposite effect (Emmons & Rollnick, 2001). Indeed, the rationale for a more collaborative stance is that, by pursuing a directive style of interaction, the clinician would risk the creation of 'resistance' (Miller & Rollnick, 2013), a concept founded within the principle of psychological reactance, (Brehm, 1966). Put simply, psychological reactance is a motivational state which seeks to re-establish one's autonomy and freedom, in light of a threat to, or the elimination of that freedom (Brehm, 1966; Brehm & Brehm, 1981). Within the theoretical framework of MI, this experience has been operationalised in the form of client 'resistance' (Miller & Rollnick, 2002; 2012). During discussions between clinician and client about behaviour change, this resistance can manifest

itself in a broad range of ways (e.g. clients voicing counter-arguments to change, or even dropping out of therapy entirely; Miller & Rollnick, 2002).

In addition to reducing client resistance, clinicians must also be aware that in amplifying ambivalence, the individual may resolve it in a number of detrimental ways. For example, clients may adopt new beliefs which are consistent with drinking, or experience a reduction in self-esteem and/or self-efficacy, making change either impossible or subjectively pointless. Either way, the individual does not resolve their ambivalence via positive behaviour change (Miller, 1983). As such, the clinician must adopt an approach which seeks to subtly direct the client toward positive behaviour change.

One central skill employed by MI clinicians to achieve such an end is reflective listening. A crucial point is that MI clinicians do not unselectively reflect back the content of client speech, or seek to impose arguments for change on the client. Rather, clinicians seek to evoke arguments for change from the client through the use of specific techniques (e.g. open questions regarding the possibility of change); selectively reflecting such arguments back to the client. This approach is adopted on the assumption that when a client verbalises the arguments for change, this will actually facilitate them moving towards it (Bertholet, Faouzi, Gmel et al 2010). This assumption is grounded in self-perception theory, which posits a simple principle; as an individual verbalises support for their views, they increase their belief in such a view (Bem, 1972). In short, the client talks themselves into changing their behaviour (Miller & Rollnick, 2004). This principle is of central importance in MI, as to elicit the client's arguments for change (what is often termed 'change talk'), is seen as a crucial precursor to actual behaviour change (Amrhein, Miller, Yahne et al, 2003; Gaume, Gmel, Faouzi et al 2008; Miller & Rollnick, 2002).

It is important to note however, that the concept of change in MI is not limited to an individual's behaviour; it would not be said that a client had not 'changed' following MI sessions on the basis of their behaviour having remained the same. Indeed the process of change in MI encapsulates covert attitudes toward the prospect of change, as well as overt behaviours; a view founded in the concept of stages of change in the trans-theoretical model (TTM) (Prochaska & DiClemente, 1984). This model proposes that as a client attempts to change a problematic behaviour, they must move throughout several stages, each one posing specific challenges to the client (Perry & Butterworth, 2011; Resnicow, DiLorio, Soet et al, 2002). These stages are identified as pre-contemplation, contemplation, preparation, action and maintenance,

with transition across these stages being a fluid, non-linear process, whereby relapse to earlier stages is possible at any point (Heather, Honekopp & Smailes, 2009; Prochaska & DiClemente, 1984). Indeed forward transition through these stages, reflected in client's increased readiness for change, is felt to be a central aim of MI (Miller & Rollnick, 2013). It is through the use of the more general components of MI (e.g. the Rogerian core conditions), combined with specific strategies to increase readiness and willingness to change, that this forward movement is achieved (Amrhein et al, 2003).

The Evolution of Motivational Enhancement Therapy

In considering the effectiveness of Brief Motivational Interventions (BMIs) in addressing problematic behaviours, Bien, Miller and Tonigan (1993) noted that these interventions will typically be more effective than control groups, where no intervention is provided. Moreover, BMIs can enhance the effectiveness of interventions which follow them, and are often equally effective compared to more exhaustive, prolonged interventions. Bien, Miller and Tonigan hypothesised that such interventions may integrate components which are necessary to facilitate behaviour change.

Miller and Sanchez (1993, as cited in Bien, Miller & Tonigan, 1993), upon reviewing the literature concerning brief interventions, noted that such approaches often integrate a number of broad components which have previously been demonstrated to be effective. They identify these components as: the provision of feedback on some behaviour or physical measure (e.g. alcohol consumed); an emphasis on the individual's personal responsibility; providing advice concerning the preferred course of action; providing a 'menu' of potential strategies to change the behaviour; the demonstration of accurate empathy, and increasing the individual's self-efficacy or optimism for change. The consideration of these effective components led Miller and Sovereign (1989) to create an intervention comprising many of these elements, named the Drinkers Check-Up (DCU), combining an MI approach with the provision of information gained via an assessment. Such information would concern an individual's drinking behaviour and physical health, and compared it with wider population norms (Miller & Rose, 2009). The clinician would seek to provide such information without providing their own appraisal of it; instead they would use MI

consistent strategies, such as open questions and reflections, to facilitate client's expression of their own concerns and judgements (Miller & Rollnick, 2013).

Miller, Sovereign and Krege (1988) predicted that the DCU would serve to increase engagement in alcohol treatments, thereby serving a preventative function. Whilst their investigation demonstrated that the DCU had no significant impact on help seeking behaviour, such an intervention did produce a sudden, modest decrease in clients' drinking. In addition, this effect was later replicated when individuals in the control condition underwent the DCU, demonstrating similar reductions in their drinking (Miller, Benefield & Tonigan, 1993). This intervention was later adapted into a manualised format, and labelled motivational enhancement therapy (MET) (Miller & Rose, 2009).

Effectiveness of MI, MET and adapted MI interventions

Evidence supports the use of MI in addressing a variety of difficulties, from alcohol and substance misuse, to enhancing treatment compliance (Hettema, Steele & Miller, 2005). Indeed, brief MI has been used more recently in medical consultations to promote patient's autonomy in making decisions about their care (Pantalon, Sledge, Bauer et al, 2013).

Lundahl and Burke (2009), in their review of three published meta-analyses, reported that MI is an intervention which is equally effective to other evidence based psychotherapies which are often completed over a greater number of sessions. This effectiveness was shown in the areas of addressing substance misuse, promoting engagement in therapy, and reducing risk increasing behaviours. Burke, Arkowitzs and Menchola (2003) reported the results of a meta-analysis investigating the efficacy of 'adapted' MI interventions. Such interventions were defined by the authors as incorporating MI principles, feedback and other non-MI strategies. These interventions yielded moderate effect sizes for a range of problem behaviours, including diet, exercise, drinking and drug use, with effect sizes ranging from 0.25 to 0.57. In a meta-analysis of RCTs investigating the effectiveness of MI, Lundahl, Moleni, Burke et al (2013) included a total of 51 RCTs. Thirty of these studies investigated MI interventions without the provision of feedback from assessment measures, whilst 21 investigated the effectiveness of MI with the provision of standardised assessment measure feedback (i.e. MET). Such motivational

interventions were an average of 106 minutes in duration, taking place across an average of 2.6 sessions for face-to-face sessions, or 3.0 sessions for interventions delivered over the telephone, as compared to an average of 30 minutes for the control group interventions. The control group constituted a range of interventions, from waitlist controls, to advice giving and cognitive-behaviour therapy (Lundahl, Moleni, Burke et al, 2013). Relative to this control group, motivational interventions demonstrated modest, but significantly better outcomes than the control group. More specifically, the motivational interventions showed particular effectiveness for issues such as HIV, dental health, alcohol consumption, smoking reduction and confidence in one's ability to change. However, motivational interventions were not significantly better than controls for addressing difficulties such as eating disorders or improving self-care (Lundahl, Moleni, Burke et al, 2013). As such, whilst MI does have a wide range of applications, it is clear that there may be contraindications for its use with specific difficulties. Indeed, clinicians should consider the available research evidence, and a client's presentation, rather than assuming MI is a universally effective approach. Moreover, the duration of the intervention does call into question whether that characteristic of the intervention is in part responsible for the significant results obtained. Korcha, Polcin, Evans et al (2014) found that a more intensive nine session MI intervention produced significantly better outcomes than a single session of MI for women with concurrent alcohol and methamphetamine addiction. Given that the motivational interventions investigated by Lundahl, Moleni, Burke et al (2013) were on average over three times the duration of the control group, it may be that the duration of the control group interventions was partly responsible for the significance of the results obtained.

Hettema, Steele and Miller (2005) reported the results of their meta-analysis of 72 investigations, studying the effectiveness of MI in addressing a wide range of problematic behaviours. They found that the average between group effect sizes following the intervention were 0.77, with this decreasing to 0.30 at 1 year follow-up. However, again control groups varied widely across the 72 investigations, with groups ranging from no-treatment or placebo, to another established treatment. Therefore, between group effect sizes must be considered in light of this. Furthermore, the effect sizes varied considerably between problem behaviours. For example, MI was shown to be most effective for addressing diet and exercise (0.78), and enhancing treatment compliance (0.72), whilst effect sizes for reducing alcohol and drug use (0.26 and 0.29 respectively) were more modest (Hettema, Steele &

Miller, 2005). Hettema, Steele and Miller (2005) stated that due to the variability in the effectiveness of MI across problem areas, and amongst clinicians who provided it, future research should seek to explain how MI exerts its positive effects on problem behaviours, and how individual clinicians may apply the approach more effectively. One recent development in the delivery of motivational interventions has been MET, whereby clinicians incorporate the provision of feedback about client's drinking into sessions.

Vader, Walters, Prabhu et al (2010), using session tapes from a parent study, demonstrated that individuals who received MI with feedback provided less 'sustain talk' (i.e. utterances in favour of the status quo). Sustain talk was found to be linked with poorer drinking outcomes. This finding is reinforced by that of Lundahl, Tollefson, Kunz et al (in press), in a meta-analysis comparing the efficacy of MI with MET. They reported that MET was significantly more effective than MI alone. Lundahl and Burke (2009) note that such findings make intuitive and theoretical sense, as MET combines MI (an already effective intervention) with an intervention which is arguably effective on its own (i.e. feedback on the problem behaviour).

In the largest alcohol misuse treatment study to date, Project MATCH (1997), MET was compared to two widely used interventions, cognitive behavioural coping skills and twelve step facilitation (a one-to-one variation of the '12 steps' approach used within alcoholics anonymous). MET was shown to be equally efficacious to these other psychotherapies in addressing alcohol misuse, however the 'absolute' efficacy of such interventions as compared to no treatment at all is unknown, as no such control group was established (Miller, 2005). Limitations withstanding, this is a particularly interesting finding given that MET was a considerably briefer intervention; MET being provided over four sessions as opposed to the twelve sessions of cognitive behavioural coping skills and twelve step facilitation. Such findings are similar to those obtained in the UKATT study, whereby equal effectiveness was demonstrated between MET and social behaviour and network therapy, with the former being briefer and more cost effective (UKATT Research Team, 2005a; 2005b).

Stage of Change Transition, MI and Client Outcomes

In addition to their brevity, MI and MET offer another advantage relative to other models of psychotherapy. That is, for those individuals who are less ready for change, these approaches offer a useful means of discussing the idea of it. The rationale for MI and MET can be understood better by referring to the notion of forward stage transition, as represented in the transtheoretical model (Prochaska & DiClemente, 1984). Indeed, this is a concept which complements MI, and though it is not a crucial component of the underpinning theory of MI, it does provide a rationale for the approach (Miller & Rollnick, 2013). Specifically, most psychotherapies, such as cognitive-behaviour therapy (CBT), are arguably focused on the individual who is ready to change. MI on the other hand, is specifically intended to allow discussions about change, with individuals who would be conceptualised as pre-contemplating, contemplating or preparing. Whilst each stage of change offers distinct challenges to the individual, one would expect an individual's forward transition through these stages to indicate their increasing readiness to change. More importantly, with transition into the later stages of the model- including action and maintenance- one may also expect observable changes in the problematic behaviour, as the individual enacts the change they have been preparing to make (Miller & Rollnick, 2013; Prochaska & DiClemente, 1984).

This specific hypothesis was tested by Heather, Honekopp and Smailes (2009), in their analyses of data obtained previously during the UKATT study. In this study, readiness to change was determined by scores on a revised version of the Readiness to Change Questionnaire (RCQ- Heather & Honekopp, 2008; see Appendix A); a 12 item questionnaire which assigns subscale scores to three stages of change, namely pre-contemplation, contemplation and action. They reported that individuals who showed forward stage transition demonstrated significant improvement in drinking outcomes. Whilst those who did not report such transitions also achieved significant positive changes in their drinking, these changes were smaller in magnitude relative to those achieved by clients who reported forward stage transition. However, these findings differ from those of Callaghan, Taylor and Cunningham (2007), who reported that their analyses of data originally obtained during Project MATCH demonstrated that forward stage transition did not result in improved behavioural outcomes. Heather, Honekopp and Smailes (2009) reconcile such differences by proposing that the means of assigning stage of change in their study

demonstrated greater validity and reliability, relative to the methods used by Callaghan, Taylor and Cunningham (2007). Heather, Honekopp and Smailes (2009) used the RCQ as opposed to the University of Rhode Island Change Assessment (URICA).

Bertholet et al (2010) also provide evidence in support of the notion that increased readiness to change positively impacts upon drinking outcomes. They studied single sessions of a BMI, intended to address 'at risk' drinking in individuals who attended a hospital emergency department. The presence of three states reflecting attitudes toward changing drinking was assumed; namely, towards change, away from change and non-determined (i.e. no change; Bertholet et al, 2010). Whilst it was noted that individuals were most likely to retain their attitude to change following the intervention, for those individuals whose attitudes did change this was most likely to be a movement from an 'away from change' attitude to a 'toward change' attitude. Moreover, individuals demonstrating a transition of attitude toward change exhibited improved drinking outcomes at 12 months follow-up (Bertholet et al, 2010). As this study identified alterations in attitudes about change on the basis of change talk and sustain talk prevalence within session and at the end of the session, the extent to which such findings can be compared with those of Heather, Honekopp & Smailes (2009) must be questioned. This is due to the fact that the latter study used an established measure to assess changes in readiness (i.e. the RCQ; see Appendix A). Nonetheless, these results concur with those cited previously.

In summary, the literature reviewed indicates that forward stage transition would have a positive effect on client drinking outcomes. The measurement of stage of change would be a useful addition to studies investigating the effectiveness of MI, as transitions in stage of change would assumedly represent an increased readiness to change. This is a key aim for MI clinicians (Resnicow et al, 2002); however this important change in client readiness may not be detected if one were to simply focus on changes in overt behaviours. Indeed, changes in readiness may occur in the earlier stages of pre-contemplation and contemplation. Therefore, traditional measures of outcome may not be sensitive to important, but covert changes in readiness to change. In addition, in investigating effective practices in MI, it may be beneficial to focus upon sessions in which changes in readiness were observed, as opposed to those resulting in behavioural changes.

Why does MI work: Part 1- Coding frameworks and definitions of types of talk

The first tool of its kind to investigate aspects of MI process was the Motivational Interviewing Skills Code Version 1.0 (MISC 1.0), which coded clinician-client interactions from video or audiotape (Miller, 2000). This tool was created to determine the quality of MI sessions, by establishing aspects of sessions such as clinician's fidelity to the treatment model and coding the sequences of clinician-client interaction (Miller, Moyers, Ernst et al, 2003). This allowed for the analysis of processes occurring within MI sessions, providing valuable insight into the more effective and important aspects of interventions. Following the use of this tool, initial aspects of the MISC 1.0 coding procedure were shown to be unnecessary, for example an emphasis on timing clinician and client talk. Subsequent revisions have been created to improve the tools application to clinical practice, in addition to increasing its reliability (Miller, Moyers, Ernst et al, 2003). These have included the MISC 2.0 (Miller, Moyers, Ernst et al, 2003) and MISC 2.1 (Miller et al, 2008).

In addition to evolutions of the MISC, alternative tools have been created to meet specific needs in training, supervision and process research. The Motivational Interviewing Sequential Code for Observing Process Exchanges (MI-SCOPE) (Martin, Moyers, Houck et al, 2005), was developed to code recorded, as well as transcribed MI sessions. Unlike the MISC however, the MI-SCOPE is intended to focus more specifically on sequential information arising from clinician-client interactions. The intention of this is to investigate relationships between MI theory, processes occurring in sessions, and client outcomes (Martin, Moyers, Houck et al, 2005). The MI-SCOPE combines Amrhein's emphasis on the need to code commitment language (Amrhein, Miller, Yahne et al, 2003) and the MISC 1.0 (Miller, 2000). An alternative tool, designed to meet the needs of trainers and supervisors of MI clinicians is the Motivational Interviewing Treatment Integrity (MITI) Code (Moyers, Martin, Manuel et al, 2003). Unlike the MISC or MI-SCOPE, the MITI seeks to focus purely on the clinician's language and behaviours in session; the aim of this being to a) to assess the treatment fidelity of clinicians in studies of MI, and b) to provide feedback to clinicians regarding the quality of their clinical practice.

These coding frameworks have been crucial in the study of underlying processes at work in MI. In focusing on these processes, researchers have sought to differentiate between the categories of client and clinician talk proposed in MI theory.

Specifically, MI states that client talk can be differentiated into two broad types; ‘sustain talk’, defined as utterances in favour of the status quo, and ‘change talk’, defined as arguments in favour of change (Miller & Rollnick, 2013; Vader, Walters, Prabhu et al, 2010). Change talk can be subdivided into ‘preparatory’ talk and ‘commitment’ talk; the former of these consisting of distinct sub-categories, including: desire (the wanting of change, e.g. “I want to stop drinking”); ability (the extent to which the person believes change is possible, e.g. “I can stop drinking”); taking steps (recent behavioural changes in favour of change made by the individual e.g. “Last month I stopped drinking in the morning”); reasons (the persons reasons for change, e.g. “drinking upsets my children”), and need (the importance of change, e.g. “I can’t keep drinking like this”) (Amrhein, Miller, Yahne et al, 2003; Martin, Moyers, Houck et al, 2005; Miller & Rollnick, 2013). These sub-categories are felt to jointly constitute preparatory talk, a category of change talk theorised as underlying, and therefore determining the strength of commitment talk. Commitment talk may be defined as a statement or statements, which obligate the speaker to a specific action at some point in future.

Clinician language is often subdivided in investigations of MI process into two broad categories; MI consistent (MICO) and MI inconsistent (MIIN) behaviours. MICO behaviours are those behaviours which are consistent with MI clinical practice, such as affirmations (Martin, Moyers, Houck et al, 2005). MIIN behaviours are those behaviours which are inconsistent with MI clinical practice, such as confrontation. The coding frameworks cited previously, and their key features are outlined in table 1.

Authors	Year	Framework	Key Features
Moyers, Martin, Manuel et al	2003	MITI	- Focuses upon and categorises clinician utterances - Does not record client utterances - Categories not mutually exclusive and exhaustive; many categories from the MISC have been collapsed - Used for fidelity checks, clinician training and supervision - Devised from the MISC
Miller; Miller, Moyers et al	2000; 2003; 2008	MISC	- Focuses upon and categorises client and clinician language - Serves a broad range of functions in research, including clinician fidelity, and investigation of process
Martin, Moyers, Houck et al	2005	MI-SCOPE	- Focuses upon client and clinician utterances and seeks to categorise them - Categories of utterances are exhaustive and mutually exclusive - Specific focus on sequential information - Devised from MISC and Amrhein's framework of coding commitment talk

Table 1: A summary of coding frameworks for MI sessions

Why does MI work: Part 2- Client talk and outcomes

The findings discussed in the previous section raise the interesting question of what specific process factors are responsible for the effectiveness of MI. In a landmark study, Amrhein, Miller, Yahne et al (2003) proposed that client commitment talk, reflecting commitment to change, is a key variable in ensuring behaviour change in clients. Previous investigations had demonstrated inconsistent associations between the frequency of client change talk in MI sessions, and outcomes observed following the intervention (see Siegfried, 1995). However, Amrhein et al devised a novel way of coding change talk, whereby the strength and frequency of client utterances was coded. The strength of commitment talk and preparatory talk was rated via the use of

a -5 to 5 scale, with greater negative and positive values indicating increased commitment against (i.e. sustain talk) or toward change (Amrhein, Miller, Yahne et al, 2003). The results of this study indicated that it was the strength, as opposed to the frequency of commitment talk, which predicted drug use outcomes at follow-up (3-12 months following the end of treatment). Interestingly, it was not the mean level of commitment strength throughout sessions which predicted outcome, but the client's commitment strength toward the end of the session (Amrhein, Miller, Yahne et al, 2003). Previous investigations had failed to measure the strength of commitment talk and preparatory talk, when exploring the relationship between change talk and outcome.

Amrhein, Miller, Yahne et al (2003) reported that each category of preparatory talk explained minimal variance in outcomes. However, these categories significantly determined the strength of commitment language, with this in turn predicting abstinence. Amrhein et al proposed that commitment talk acts as a mediator, representing a single pathway by which client talk could impact upon outcomes. In this proposed model of action, preparatory talk does have an influence on client's behaviour, albeit indirectly (Miller, Moyers, Ernst et al, 2003).

Further research examining the effects of preparatory and commitment talk on client outcomes demonstrates some inconsistency, both in terms of the methods used to code client talk and the findings obtained. Martin, Christopher, Houck et al (2011), using data originally collected during Project MATCH, reported that the frequency of preparatory talk was linked to drinking outcomes, whilst the frequency of commitment talk was not. In addition to this, client commitment talk and ability talk were also reported to be strongly associated with each other. Martin, Christopher, Houck et al (2011) propose that the link between commitment talk and ability talk reflects that individuals will not commit to a change if they feel unable to carry it out. In addition, they propose that their findings demonstrate the need for clinicians to focus on evoking a greater frequency of all types of change talk in MI sessions, rather than focusing purely on evoking more commitment talk to facilitate behaviour change. However, whilst this investigation did categorise utterances, and assigned them a 'direction' indicating whether they were in support of change or for the status quo, the method of coding client talk differed from that used by Amrhein, Miller, Yahne et al (2003). Specifically, the strength of client's commitment and preparatory talk was not rated (i.e. from -5 to 5). As such, it is difficult to refute the findings of Amrhein et al on the basis of this study, given that Amrhein, Miller, Yahne et al

(2003) emphasised commitment strength (especially toward the end of the session), not the frequency of commitment talk as the key variable which determines behaviour change.

Conversely, Hodgins, Ching and McEwen (2009), during a single session of MI focusing on problematic gambling behaviour, echoed the coding procedure of Amrhein, Miller, Yahne et al (2003), coding client utterances on the basis of strength, direction (toward or against change) and category (commitment talk or preparatory talk). Results from this study indicated that clients who voiced stronger commitment talk during the session experienced better outcomes at 12 month follow-up, relative to those who expressed weak or no commitment to change. However unlike Amrhein, Miller, Yahne et al, it was the strength of commitment talk throughout the whole session, not at the end of the session, which predicted behaviour change. Interestingly, though not all subcategories of client preparatory talk predicted stronger commitment talk (as in Amrhein, Miller, Yahne et al, 2003), stronger ability and readiness talk were associated with stronger commitment talk. As such, ability and readiness had an indirect effect on client behaviour.

Further support for the role of stronger commitment talk in facilitating behaviour change is provided by Aharonovich, Amrhein, Bisagam et al (2008). This study did not investigate processes taking place in sessions of MI, but instead focused on CBT sessions aimed at addressing substance misuse in individuals with impaired cognitive functioning. It was found that the mean commitment strength throughout CBT sessions predicted reduced drug use at the end of treatment, with higher strength predicting better outcomes. This study could indicate that the strength of commitment talk is an important predictor of outcomes not only in MI, but in other evidence-based approaches which are used in the area of substance misuse. This is the first study of the importance of commitment talk strength outside of MI and more research in this area is required.

The above findings are inconsistent with those of Baer, Beadnell, Garrett et al (2008), who investigated the effectiveness of a BMI in addressing substance misuse in homeless adolescents. Coding client talk in these BMI sessions, it was found that the frequency of positive reason talk (i.e. supporting change) and negative ability and desire talk (i.e. against change), was associated with poorer outcomes. In addition, the frequency of commitment talk in either direction (toward or against change) was not associated with outcomes. However it is important to specify that similar to Martin, Christopher, Houck et al (2011), whilst the frequency and direction of commitment

and preparatory talk in sessions was coded, the strength was not (Baer, Beadnell, Garrett et al, 2008).

This issue was addressed in a recent study by Gaume, Bertholet, Faouzi et al (2013), who investigated the impact of change talk and counter-change talk as overall categories on client drinking outcomes. In addition, they investigated the effects of sub-categories of change talk, as included in the MISC. A brief 20-30 minute MI session was conducted with 127, 20 year old men to investigate whether links between change talk and drinking outcomes were present in the younger population. The overall categories of change talk, counter-change talk and follow/neutral were not significantly related to change when the frequency or length of such utterances was examined (Gaume, Bertholet, Faouzi et al, 2013). However, when the strength of these categories was analysed, the averaged strength (i.e. the strength of change talk on average across the session) was associated with positive behaviour change, albeit just below the level of significance ($p = .07$).

Upon examining sub-categories of change talk, the authors found that it was necessary to group together ability, desire and need to change, and ability, desire and need not to change under two separate larger groups, due to the poor inter-rater reliability of such subcategories. Once grouped together, the frequency of ability, desire and need to change and not to change, predicted significant behavioural change in the expected directions (Gaume, Bertholet, Faouzi et al, 2013). In addition, the average strength of ability, desire and need grouped together, predicted significant change in the expected directions. The average strength of commitment in sessions was not predictive of outcome. However, when the strength of commitment utterances was subdivided further, more commitment of the weakest category, +1, was associated with negative behavioural change, whilst more commitment of the highest category, +3, was associated with positive behavioural change, albeit only approaching significance ($p = .09$) (Gaume, Bertholet, Faouzi et al, 2013). Gaume et al suggest that such a finding may indicate differences in the meaning such commitments have for clients. Specifically, milder commitments may represent an attempt to distance oneself or dilute one's intention to change problematic behaviours, whereas a strong commitment utterance may indicate a level of conviction qualitatively different from weak commitments.

Exploring the role of commitment talk upon a number of client outcomes, Perry and Butterworth (2011) aimed to investigate the effectiveness of a single MI session, embedded within a broader 12 week programme. This intervention was

intended to increase the levels of physical activity in 20 women, with the impact of the intervention upon such behaviour, and stage of change being analysed. Using a coding procedure similar to that of Amrhein, Miller, Yahne et al (2003), the authors coded the strength of client's commitment talk in the MI sessions. It was found that stronger commitment talk toward the end of the single MI session was not associated with increased physical activity in women. Most intriguing however, was the finding that stronger commitment talk was associated with forward movement in stage of change following the intervention. In addition, such forward movement in stage of change was associated with increased physical activity. The authors propose that the forward movement of individuals through the stages of change acts as a precursor to behaviour change (Perry & Butterworth, 2011).

Though this finding is inconsistent with those mentioned previously, Perry and Butterworth (2011) argue that this finding may be due to the study design. This is specifically due to the MI intervention being a single 30 minute session, in a much broader 12 week programme, and the MI intervention being provided to a small sample (n= 20). As such, the authors conclude that their correlation analyses may have been underpowered. Indeed, Perry and Butterworth state that whilst the strength of commitment talk was not significantly associated with physical activity, an observed trend was that those who voiced stronger commitment talk in MI sessions did report more physical exercise (Perry & Butterworth, 2011).

It should be noted however, that investigations into categories of change talk and how they individually predict behaviour change vary widely, both in terms of the interventions provided, and the measures used to monitor outcomes. As such, comparisons amongst studies are difficult. Nonetheless, on the basis of the aforementioned evidence, one may expect more effective interventions to elicit stronger preparatory and commitment talk, with stronger commitment talk predicting client outcomes. In addition, one may also expect stronger commitment talk to be associated with forward movement in stage of change; such forward movement acting as a possible precursor to behaviour change. The findings of the studies cited previously are summarised in table 2.

Author(s)	*Publication Year*	*Sample Size*	*Findings*
Amrhein, Miller, Yahne et al	2003	*84*	-Commitment talk strength predicted client outcomes - Preparatory talk explained minimal variance in outcomes, but predicted the strength of commitment talk
Martin, Christopher, Houck et al	2011	*118*	- Preparatory talk predicted drinking outcomes, whilst commitment talk didn't. - Commitment talk and ability talk were strongly associated with each other.

Hodgins, Ching & McEwen	2009	*83*	- Stronger commitment talk predicted better outcomes at 12 month follow-up, relative to weak or no commitment talk. - Preparatory talk didn't predict outcomes. - Ability and readiness were associated with commitment strength.
Aharonovich, Amrhein, Bisagam et al	2008	*24*	- Higher mean commitment strength in sessions predicted reduced drug use at follow-up.
Baer, Beadnell, Garrett et al	2008	*75*	- Reason talk was associated with positive outcomes - Sustain talk was associated with poorer outcomes. - Commitment statements were not associated with outcomes
Perry & Butterworth	2011	*20*	- Commitment strength not associated with exercise outcomes. - Commitment strength associated with stage of change.

Table 2: A summary of research investigating client talk and outcomes

Why does MI work: Part 3- Clinician Behaviour

MI Practices and Client Change Talk

Considering the effectiveness of MI, and the effect that commitment talk has on outcomes, it is not surprising that when clinicians adopt practices consistent with MI, positive outcomes are reported. Vader, Walters, Prabhu et al (2010), in their study of the effects of MI with and without feedback on client talk and drinking outcomes, demonstrated some interesting findings. Using the MISC 2.1 to code client and clinician talk, they found that MICO behaviours were associated with the frequency of client change talk but not sustain talk, as such that greater use of MICO behaviours was associated with more change talk (Vader, Walters, Prabhu et al, 2010). However, in the MI alone condition, MICO behaviours were associated with more frequent change talk and sustain talk. This is an interesting finding, given the emphasis in MI is on eliciting change talk.

Whilst it could be argued, due to the non-clinical sample, that these findings are not relevant to clinical practice, similar findings are reported in a number of other studies. Such findings are consistent with those of Catley, Harris, Mayo et al (2006), who reported that greater use of MICO behaviours- coded using the MISC- was associated with more frequent change talk from clients. Moyers and Martin (2006) reported similar findings from their sequential analysis of interactions during MET sessions; originally completed during Project MATCH. They reported that more frequent use of MICO behaviours by clinicians caused an increase in the frequency of client change talk, whilst greater use of MIIN behaviours caused an increase in the frequency of client sustain talk.

Apodaca and Longabaugh (2009), in their systematic review of 19 MI studies, sought to investigate plausible mechanisms of change in MI. They evaluated the effects of clinician and client talk on outcomes, and reported that the most promising evidence for a mechanism of change was client change talk and clients' experiences of discrepancy (i.e. between their behaviour and values and/or goals). In addition, MIIN behaviours were also found to be related to negative outcomes. Interestingly, variables representing the 'spirit' of MI (i.e. collaboration, evocation of arguments for change, emphasis on client autonomy; Miller & Rollnick, 2013), did not appear to account for the behavioural changes clients experienced following MI (Apodaca &

Longabaugh, 2009). Furthermore, client change talk was noted to have a moderate effect on outcomes, and therefore was reported to represent a possible mechanism of change in MI. However, the authors noted that the causal link between clinician MICO behaviours and client outcomes had not yet been studied within the literature. As such, no causal chain between clinician behaviour, client talk and outcomes had been established. Nonetheless, these findings appear consistent with the notion that clinician behaviours consistent with MI practices are more likely to elicit change talk, whilst MI inconsistent practices are more likely to elicit sustain talk.

Further evidence for the effect of clinician MICO and MIIN behaviours on client language is provided by Gaume, Gmel, Faouzi et al (2008). In a sequential analysis of brief MI sessions, coded using the MISC 2.0, it was reported that MICO behaviours were the only behaviours which were associated with significantly more client change talk. Moreover, clinician MIIN behaviours and MI unrelated behaviours, were more likely to cause client talk unrelated to alcohol use, and significantly less likely to cause client change talk (Gaume, Gmel, Faouzi et al, 2008). Interestingly, the authors also reported that client change talk is more likely to be followed by clinician MICO behaviours. Such findings demonstrate the complex reciprocal patterns at work in MI sessions.

Tollison, Lee, Neighbors et al (2008) conducted a study investigating the impact of specific categories of clinician talk on clients' contemplation of change and drinking behaviour at three months post intervention. Individuals delivering the MI intervention were the participants' college peers- three undergraduates, and three graduates- who had undergone training by specialist clinical psychologists. Using the MITI to code MI sessions, the peer clinicians engaged with 53 first year college participants in a single, 60 minute session of MI. Participants were all first year college students assessed as engaging in high levels of alcohol consumption (specifically, females consuming more than 4 alcohol drinks, or males consuming more than 5 alcoholic drinks, on at least one occasion in the last 30 days; Tollison, Lee, Neighbors et al, 2008). Results demonstrated that a higher number of closed questions, relative to open questions, from the peer clinicians was related to less contemplation to change by the clients. On the other hand, the opposite pattern- more open relative to closed questions- was related to greater contemplation of change by the clients three months following the MI session. In addition, more simple reflections led to greater drinking behaviour at three months; an effect which was reduced by the presence of more complex reflections.

Tollison, Lee, Neighbors et al (2008) summarise these findings as indicating that experience and high level skills in engaging clients whom are ambivalent or resistant to change is crucial. More specifically, there is a risk that less experienced clinicians may offer simple reflections as a potential means to overcome resistance from clients, but may inadvertently make client's resistance worse, which in turn leads to worse drinking outcomes. Tollison, Lee, Neighbors et al emphasise the need to investigate what they termed "higher level" MI skills- that is, complex reflections offered during times of contemplation by the client- rather than just attempting to offer a complex reflection of a trivial statement (Tollison, Lee, Neighbors et al, 2008, pp. 191). Tollison et al propose that the lack of attention in previous studies to the unique sequences of interaction between clinicians and clients, may have limited such studies findings. Given the lack of sequential analyses of therapy interactions, and the reliance on statistical associations in the data, the findings of Tollison, Lee, Neighbors et al do not offer strong evidence of causations between different categories of clinician talk and client outcomes. However, it may be of interest in future studies to investigate these chains of interaction in MI sessions, to determine how clinicians and clients mutually affect each other to produce change talk and sustain talk.

Clinician-client interactions and client outcomes

It is not surprising given the effects clinician behaviours have on client talk, and the effects client talk has on outcomes, that clinician behaviours have been investigated as a possible predictor of outcomes in MI (Martin, Christopher, Houck et al, 2011). In a recent study exploring the effects practices supported in MI have upon drinking outcomes, Magill, Stout, and Apodaca (2013) explored the impact of the clinician's emphasis on exploring ambivalence and commitment to change on client's drinking. Data from participants in the aftercare and outpatient arms of Project MATCH were used to create multilevel models, which investigated the impact of emphasis on these two core practices on percent days abstinent and drinks per drinking day over the 12 week treatment. Interestingly, clinician's focus on client's commitment to change was associated with reduced drinking in participants within the outpatient arm, and increased abstinence in both treatment arms (Magill, Stout & Apodaca, 2013). However, clinician's emphasis on client ambivalence was actually associated with greater drinks per drinking day among outpatients and aftercare clients; though clients

in the latter group only drank more when their motivation was identified as low. However, due to the lack of analyses examining causal relationships, it is difficult to establish the extent of any causal role such clinician behaviour had on increased or decreased drinking behaviour. However, such responses may in part be explained by the analysis of available outcome research by Miller & Rose (2013), which argues that a clinician's responses to client's ambivalence may reduce or increase commitment to change the target behaviour. Indeed, clinicians who respond to ambivalence in sessions with attempts to evoke change talk may increase client's commitment to change, whilst attempts to engage in discussion of client's decisional balance may actually reduce commitment. As such, it may be that a clinician's use of decisional balance or evoking strategies in response to client ambivalence, may decrease or increase client's commitment respectively. Given previously cited findings, this would likely have an impact on client's behaviour. Such a suggestion highlights the need for clinicians to consider tailoring their approaches to the client's motivational state in MI sessions.

Moyers, Martin, Houck et al (2009) note that whilst client talk has been repeatedly associated with behavioural outcomes, there are few studies within the MI literature investigating the possible causal chains through which this occurs. This state of affairs mirrors that within the wider psychotherapy process literature, in which the exhaustive use of correlation methods in research has provided little information about causal mechanisms in psychotherapy (Garfield, 1990; Lambert, 2004).

Using first session recordings of MET sessions conducted as part of Project MATCH, Moyers, Martin, Houck et al (2009) sought to establish a causal chain for MI. Coding sessions with the MI-SCOPE and calculating transitional probabilities between clinician and client utterances (defined as the probability that a particular behaviour will immediately occur following another particular behaviour), the authors noted that specific clinician utterances predicted subsequent client change talk. Interestingly, the strength of the association between MICO behaviours and client change talk was relatively weak, compared to the association between reflections and subsequent change talk (Moyers, Martin, Houck et al, 2009). In addition, clinician MIIN behaviours were reported to be negatively associated with client change talk. However, it is interesting to note that both MICO and MIIN behaviours were associated with client sustain talk. This finding is similar to that noted by Vader et al (2010), who also reported an association between MICO behaviours and client sustain talk. This finding was interpreted by Moyers, Martin, Houck et al (2009) as indicating

the persistent nature of sustain talk, even when clinicians are adhering to MI practices and the client is also demonstrating increasing change talk (Moyers, Martin, Houck et al, 2009).

Whilst such co-occurrence of change talk and sustain talk may be an unintentional artefact of MI practices, future investigations should focus on specific strategies clinicians can use to reduce the occurrence of sustain talk in these instances. In addition, further research examining causal links between clinician behaviours, and change and sustain talk would be enlightening. Whilst Moyers, Martin, Houck et al (2009) provide a unique insight into causal chains in MI- including clinician behaviours which are more likely to cause change and sustain talk- the vast majority of research has broadly categorised clinicians' behaviour as MICO or MIIN. Given the established links between client talk (specifically commitment talk) and outcomes, and MICO behaviours and client talk, future studies which seek to break down these broad categories of clinician behaviour into specific behaviours would be very enlightening. Such studies would provide greater insight into the processes occurring during MI, and could possibly inform future clinical practices. The previously cited studies are summarised in table 3.

Authors	*Publication Year*	*Sample Size*	*Findings*
Vader, Walters, Prabhu et al	*2010*	*MI plus feedback, n= 73* *MI alone, n= 70*	- In MI plus feedback, MICO behaviours were associated with change talk but not sustain talk. - In MI alone, MICO behaviours were associated with both change talk and sustain talk. - In MI plus feedback, clients provided less sustain talk, compared to MI alone.
Catley, Harris, Mayo et al	*2006*	*89*	- MICO behaviours were associated with higher levels of change talk
Moyers & Martin	*2006*	*225*	- MICO behaviours caused greater instances of change talk

Apodaca & Longabaugh	*2009*	*Systematic review of 19 studies*	- Client change talk and experiences of client discrepancy were linked most strongly to outcomes. - MIIN behaviours were related to negative outcomes. - Variables representing the 'spirit' of MI didn't account for the outcomes observed. - Change talk had a moderate effect on outcomes.
Gaume, Gmel, Faouzi & Daeppen	*2008*	*97*	- MICO behaviours more likely to be followed by change talk. - MIIN behaviours and MI unrelated behaviours more likely to be followed by client talk unrelated to alcohol use, and less likely to precede change talk. - Change talk more likely to be followed by MICO behaviours.
Tollison, Lee, Neighbors, Neil, Olson & Larimer	*2008*	*53*	- The use of more closed questions, relative to open questions, is associated with less contemplation of change post-intervention - The use of more open questions, relative to closed questions, is associated with more contemplation of change post intervention. - Greater use of simple reflections is associated with increased drinking post intervention; an effect which is reduced by the use of complex reflections.

Miller & Rose	*2013*	*Summary of clinical outcome studies; sample size unavailable.*	- Clinicians using a 'decisional balance' approach to client's ambivalence decrease commitment to change. - Clinicians using a 'decisional balance' approach with clients who have already decided to change may increase commitment to that change. - Clinicians who attempt to evoke change talk from clients who are ambivalent increases the probability of behaviour change. - Clinicians' attempts to elicit change talk with clients who have already decided to change could possibly lead to a reduced probability of change, and is proposed to be needless.
Magill, Stout & Apodaca	*2013*	*Aftercare arm, n= 261; Outpatient arm, n= 316*	- Clinician focus upon commitment to change was associated with reduced drinks per drinking day in the outpatient arm, and increased abstinence in both treatment arms - Emphasis on client ambivalence was associated with greater drinks per drinking day in both treatment arms. However, clients in the aftercare treatment arm only drank more when experiencing low motivation.

Moyers, Martin, Houck, Christopher & Tonigan	*2009*	*118*	- Frequency of change talk predicted outcomes. - Specific behaviours were linked to change talk - Association between MICO behaviours and change talk was weak, relative to that between reflections and change talk. - MIIN behaviours produced less change talk. - Both MICO and MIIN behaviours were associated with sustain talk.

Table 3: A summary of research investigating clinician behaviours in MI

Why does MI work: Part 4- Therapist Variability in Outcomes

Given the effects MICO behaviours have on client talk, and the effect client talk has on outcomes- it could be assumed the use of an MI approach would result in broadly positive outcomes across clinicians. However, Moyers, Martin, Houck et al (2009) in reviewing the findings of previous MI studies, revealed that a great degree of variability exists in the outcomes clinicians attain. More surprisingly, such variability exists despite the use of standardised supervision, materials and training (see Carroll, Ball, Nich et al 2006). Within Project MATCH, large therapist effects were found, with a minority of clinicians accounting for the majority of variance in negative client outcomes (Project MATCH, 1998). Moyers, Martin, Houck et al (2009) proposed that such findings were likely the result of clinicians adopting specific strategies or 'active ingredients' to varying degrees in MI sessions.

As noted previously, few studies have examined the role of specific clinician behaviours in causing different categories and strengths of change talk (including strong commitment talk). Instead, studies have in the majority attempted to establish causal links between broad categories of clinician behaviour (e.g. MICO behaviours), client talk and outcomes (Gaume, Gmel, Faouzi et al, 2008). Miller and Rose (2009) highlighted the need for future research to 'look under the hood' of MI, as the mechanisms by which MI facilitates behaviour change are still largely unknown. Indeed, in reviewing the psychotherapy process literature, Lambert (2004) reports that variance in the outcomes of clinicians is unlikely to be exclusively due to personal qualities. Moreover as previously noted, within MI positive outcomes cannot be attributed to the 'spirit' of the intervention alone (see Apodaca & Longabaugh, 2009).

Lambert (2004) argues that this variability in outcomes will partially be the result of differences in technique, and that future process research should seek to establish the specific clinician behaviours which cause such variability. However, one should keep in mind the relative amount of variance accounted for by the specific techniques of therapeutic approaches. Indeed, as identified by Wampold (2001), events occurring outside of psychotherapy account for a substantial proportion of variance in client outcomes. Therefore, whilst this area of investigation may have useful clinical implications, the relative impact of these behaviours on outcomes must be kept in mind.

Nonetheless, the need to investigate the specific clinician behaviours which facilitate good outcomes is highlighted consistently in the MI process literature (see Apodaca & Longabaugh, 2009; Hodgins, Ching & McEwen, 2009; Martin, Christopher, Houck et al, 2011). Such research is cited as having possible applications to clinical practice and training, in that it may inform clinicians about which aspects of MI practice are most helpful to focus on, and could have implications for how clinicians are trained.

Summary

The evidence supports clinicians eliciting strong change talk, and specifically strong commitment talk, as a key part of their practice in MI to facilitate behaviour change. Recent research has also identified that particular clinician behaviours may be useful in specific situations. Specifically, behaviours which evoke preparatory talk may be suitable for use with clients not yet ready to commit to change, whilst behaviours focused on presenting the balance of information for and against change may be suitable for clients who are ready to commit to change. Further research is indicated which investigates the specific clinician behaviours that can elicit strong commitment talk, as opposed to collapsing these behaviours into larger categories (i.e. MICO behaviour). In addition, research which sheds light on the specific behaviours and strategies that evoke preparatory talk- a key precedent for commitment to change- is warranted. In particular, research which can uncover possible causal links in this area, as opposed to associations, would be beneficial. Such research may go some way to explaining the variability in clinician's effectiveness which has been observed in previous studies.

Previous research has provided some insight into this area, but has not integrated the methodology of previous studies such as that by Amrhein, Miller, Yahne et al (2003). Many studies have failed to code client change talk on the basis of strength, whilst differentiating between subcategories of change talk (i.e. commitment and preparatory talk). In addition, by focusing purely on practices which facilitate behavioural change, practices which may facilitate equally important attitude change may have been overlooked. Indeed, an increase in a client's level of readiness is a key aim in MI treatment.

One must acknowledge the relatively small role specific clinician behaviours have in determining client outcomes, relative to other factors such as events outside of therapy. However, the variance in clinicians' outcomes- variance which cannot be accounted for by the 'spirit' of MI or personal characteristics- requires further investigation, so that more helpful practices may be highlighted. The study of specific clinician behaviours which evoke preparatory talk and strong client commitment talk, focusing on interactions which fostered increased readiness to change, is warranted.

Research Question

Using video and audio data already acquired through the UKATT study, this thesis will perform a secondary analysis to explore the extent to which specific clinician behaviours are predictive of client preparatory talk and strong commitment talk. This study will sample individuals who reported forward transition in stage of change. This transition is assumed from scores on the RCQ (see Appendix A) across three follow up points. The following research question was proposed:

Which specific clinician utterances are predictive of client's preparatory utterances and strong commitment utterances?

Hypotheses

On the basis of the literature and discussions with researchers in the field of MI, the following hypotheses were made:

1. Complex reflections will be associated with, and predictive of, clients' strong commitment talk.
2. Open questions will be associated with, and predictive of, clients' preparatory talk.

Method

Overview & Context

This was a secondary quantitative analysis of UKATT process data, collected as part of the original UKATT study. I adopted a judge-observer role in carrying out the study, as such that I made judgements regarding clinician's and client's utterances, made in previously recorded MET sessions. Such judgements were made using a modified version of an established coding framework (i.e. the MI-SCOPE). Therefore, I did not have any direct contact with the original UKATT participants, instead using only digital audio recordings of sessions which occurred as part of the original UKATT study.

The UKATT trial was a randomised control trial conducted over several treatment centres in the United Kingdom, including the Leeds Addiction Unit. It directly compared the effectiveness of up to eight sessions of social behaviour and network therapy, with up to three sessions of MET (Orford, Hodgson, Copello et al (2009). The UKATT trial recruited 742 participants, and produced a wide range of data concerning the outcomes of sessions, and the processes which occurred within sessions. Such data includes video and audio recordings of all psychotherapy sessions which occurred during the trial. It is these video and audio recordings which have been used for the purposes of this study

Participant & Data Selection

Participant Selection Pilot

In order for a UKATT participant's session recording to be included in this study, the participant had to have been assigned to the MET treatment arm of the UKATT study (UKATT Research Team, 2001). Recordings of these MET sessions were obtained from the UKATT database located at the Leeds Addiction Unit. To facilitate the use of session recordings, such recordings were converted from their original DVD format to a Wav (WAVE) format using conversion software. This process ensured that the recordings were of a format that made them compatible with the CASAA Application

for Coding Treatment Interactions (CACTI) software used in this study. All recordings were subsequently audio only.

As part of the UKATT study, participants undertook a maximum of three sessions of MET, the first of which required the provision of feedback of data concerning client's drinking, in addition to any physical and mental health difficulties linked to this. Moreover, as part of the first session, clients were encouraged to bring a significant other, for the purpose of providing further information and to increase client's motivation for change (UKATT Research Team, 2001).

In examining the literature, there were relatively few precedents to guide the sampling of data from a several session intervention, such as the MET arm of the UKATT study. It was apparent that previous sampling methods had often been limited by using data arising from BMIs, often involving a single session (see Bertholet, Faouzi, Gmel et al, 2010; Gaume, Gmel, Faouzi et al 2008; Hodgins, Ching & McEwan, 2009; Vader, Walters, Prabhu et al, 2010). Other previously studied motivational interventions had involved separate assessment and feedback sessions, such as the DCU detailed by Miller, Benefield and Tonigan (1993). Moyers, Martin, Houck et al (2009) however, provided a helpful precedent in that they used recordings obtained as part of Project MATCH- whereby a maximum of four session tapes for each client were available to sample. Moyers et al decided to sample from session one tapes, due to such tapes constituting the largest sample size.

In this study, the sampling procedure originally followed the example set by Moyers et al, in that only first session tapes were subject to parsing, coding (using the MI-SCOPE) and subsequent analyses. This occurred partly due to the greater availability of first session tapes- relative to other sessions- ensuring the maximum sample size possible from the UKATT database. However, discussions with my supervisors (researchers and clinicians experienced in MI and MET) also led to the hypothesis that the first session may serve as a context for triggering increases in readiness to change. This hypothesis was suggested on the basis that, following the feedback of data concerning client's drinking habits in the first session, significant changes in client's commitment to change could occur in the same session (as noted by Amrhein, Miller, Yahne et al, (2003) and Amrhein, personal communication, 2013).

Only successful interventions- that is, session tapes from participants who demonstrated an increased readiness to change after the session - were included in this study. This increased readiness to change was determined from scores on the RCQ

(see Appendix A). The RCQ was completed by participants immediately following the assessment session (which occurred prior to the 3 session MET intervention), at 3 months post-intervention and at 12 months post-intervention, as per the UKATT intervention protocol. The session tapes selected were from participants who advanced in their stage of change, from assessment to 3 months follow-up, and then either demonstrated positive change or remained in the same stage of change from 3 months to 12 months follow-up. This sampling method was used on the basis that individuals who express greater forward movement in readiness to change, also tend to experience larger reductions in drinking behavior (Heather, Honekopp & Smailes, 2009). As such, these sessions were a likely source of promising interactions.

On the basis of these criteria, preliminary screening of the UKATT database revealed that 53 participants were suitable for inclusion in the study. Session recordings for those clients whose RCQ data were not available were excluded. This process of participant selection is illustrated in figure 1:

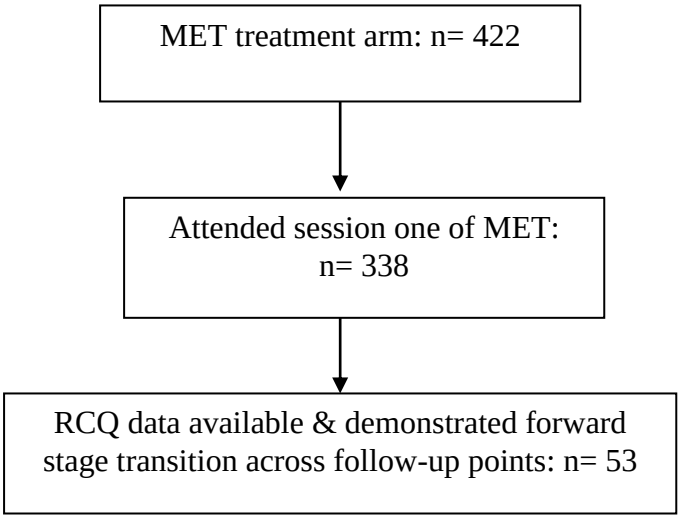

Figure 1: A flowchart of participant inclusion criteria for the current study

Possible Amendments to Participant Selection

Whilst discussions with supervisors had determined participant and session selection criteria, it was agreed that if the hypothesis that first session tapes were the most

promising source of preparatory talk and commitment talk was proven wrong, then I should not rule out the possibility of using other session tapes. It was agreed that the selection of participant's session tapes should also allow for the sampling of sessions two and three, if observations during the analysis process revealed that these sessions contained greater amounts of preparatory talk and commitment talk. However, these second and third sessions would be sampled from the same pool of 53 participants previously outlined.

The rationale for this possible change in sampling method was twofold. Firstly, if it was apparent following the beginning of the parsing and coding process, that first session tapes were frequently lost from the database or had insufficient audio quality for use, then other tapes could be used to maintain a sufficient sample size. Secondly, should observations during the parsing and coding process reveal that preparatory talk and commitment talk did not occur often in the first session, then other more promising tapes could be selected. In the event of either issue, the plan would then be to sample from participant's alternative tapes.

Sample Representativeness

It is difficult to make the claim that the sample of the current study is representative of the population being examined. This is due to the high percentage of individuals who declined to participate (42.1%), or were classed as ineligible to participate (23.7%), in the original UKATT trial, from which all data included in this study is sourced (UKATT Research Team, 2005b). However, the UKATT study had a large sample, and used exclusion criteria comparable with those of Project MATCH and other trials at the time of that study (UKATT Research Team, 2001). As such, it is likely that such a sample is no less representative of the population of interest than the highest quality studies in the field of alcohol misuse to date.

Data analysis

CASAA Application for Coding Treatment Interactions (CACTI)

In considering possible methods of analysing MET recordings, it was apparent from the research question that any analysis method would have to allow for the

identification of sequences in sessions. Client and clinician utterances would need to be identified and separated out from each other (i.e. parsed), with these utterances being assigned codes from an established framework. This would allow for the analysis of categories of utterances which were of interest.

These demands were met by the use of CACTI; a transcript free, downloadable software program. CACTI allows users to amend the software, allowing the researcher to analyse interactions in accordance with their interests (Glynn, Hallgren, Houck et al, 2012). More specifically, CACTI allows users to modify the user interface, and the codes the software can assign. Users parse and subsequently assign codes to sequential interactions, with CACTI creating output files to store this data. Changes made during the parsing or coding of audio recordings are made in real-time; that is, every new parsed or coded utterance results in an update of the saved file (for more information, see Glynn, Hallgren, Houck et al, 2012).

Amendments to CACTI

It was first important to consider how CACTI could be modified to examine the research question. Therefore, the specific coding framework to be used and the codes of interest needed clarification. Following this process, I could then alter CACTI to parse and code the sampled recordings. The MI-SCOPE was selected for this study, as this coding framework is specifically designed to examine sequential data (Martin, Moyers, Houck et al, 2005)

The MI-SCOPE contains 19 codes of clinician talk, and 8 codes of client talk (see Martin, Moyers, Houck et al, 2005). For the purposes of this study, it was decided that some categories could be collapsed and amended, on the basis of previous research. Many previous studies which have sequentially analysed motivational interventions collapsed categories of interest. This often occurred due to the lack of sufficient data to examine the sequences between all categories in transition matrices (for example, if one was to examine the frequency with which each MI-SCOPE clinician code precedes each client code, one would require expected frequencies of 2-3 or more in 152 cells (Bakeman & Gottman, 1997; Wickens, 1982). Gaume, Gmel, Faouzi et al (2008), in using the MISC to code clinician and client utterances, found that 53.8% of the cells in their transition matrix (which contained the same number of cells as would be present with the use of the MI-SCOPE) had expected frequencies too low to permit an analysis of them.

Most often, studies have collapsed specific clinician categories under the general categories of Motivational Interviewing consistent (MICO) and Motivational Interviewing inconsistent behaviours (MIIN). In addition, client codes have often been collapsed under the general categories of Change Talk (CT), Counter-Change Talk (CCT) and Follow/Neutral or Ask (F/A) (see also Moyers & Martin, 2006). When conducting a sequential analysis, it is generally advised that expected frequencies equal to, or greater than 2-3 are obtained for the majority of cells in a transition matrix (Bakeman & Gottman, 1997; Wickens, 1982). The current study sought to collapse and amend categories included within the MI-SCOPE. This was done to reduce the likelihood that categories of interest would need to be collapsed later in the analysis process, for the purpose of gaining high enough expected frequencies.

CACTI allows users to delete or edit existing categories, whilst entering new ones for coding. This process occurs via the editing of a configuration xml file (guidance on how to do this can be found in the user guidance and operational manual documents included with the CACTI download file). For the purposes of this study, coding categories were edited using Microsoft XML Notepad. The 'preparatory' categories of change talk (including reasons, need, ability and taking steps in favour of change) were amalgamated under the more general category of 'preparatory talk'. As noted previously, change talk can be defined as client statements in favour of behaviour change (see Amrhein, Miller, Yahne et al, 2003; Gaume, Gmel, Faouzi et al 2008; Miller & Rollnick, 2002). This broad category can be subdivided into 'preparatory' talk and 'commitment' talk; the former of these consisting of distinct sub-categories, including: desire (the wanting of change, e.g. "I want to stop drinking"); ability (the extent to which the person believes change is possible, e.g. "I can stop drinking"); taking steps (recent behavioural changes in favour of change made by the individual e.g. "Last month I stopped drinking in the morning"); reasons (the persons reasons for change, e.g. "drinking upsets my children"), and need (the importance of change, e.g. "I can't keep drinking like this, I need to stop") (Amrhein, Miller, Yahne et al, 2003; Martin, Moyers, Houck et al, 2005; Miller & Rollnick, 2013). These sub-categories jointly constitute 'preparatory talk'.

The decision to collapse these specific categories of client talk under the more general category of 'preparatory talk' was taken following a consultation with researchers in this area (personal communication; Amrhein, 2013) and following consideration of the study carried out by Amrhein, Miller, Yahne et al (2003). The

results of this study indicated that these sub-categories of preparatory talk jointly determined the strength of commitment talk. However, they accounted for minimal variance in the strength of commitment talk individually, and have demonstrated inconsistent associations with outcomes across other studies (see table 2). It was therefore felt that they did not warrant analysis as individual sub-categories. Commitment talk can be defined as a client statement or statements, which obligate the client to a specific action at some point in future (Amrhein, Miller, Yahne et al, 2003). The MI-SCOPE states that these can be client statements that deal with changing (positive commitment) or maintaining (negative commitment) the target behaviour (Martin, Moyers, Houck et al, 2005). For example, a positive commitment statement would be "I am definitely going to stop drinking", whereas a negative commitment statement would be "I am never going to stop drinking".

The categories of commitment, reasons, need, ability and taking steps in favour of the status quo were amalgamated under the category of 'sustain talk'. Therefore, 'sustain talk' in this study can be defined as client statements of commitment, reason, need, ability and taking steps in favour of the status quo (e.g. in the case of commitment to the status quo, a client may say "I'm not going to stop drinking"; in the case of a reason statement in favour in the status quo, a client might say "drinking makes me feel good about myself"). Commitment talk in favour of the status quo was not kept as a stand-alone category, as the current study did not aim to investigate what clinicians say to prevent change.

'Other' utterances in favour of change remained as a distinct category, given the specific definition of 'other' in the MI-SCOPE (Martin, Moyers, Houck et al, 2005). Specifically, 'other' utterances within the MI-SCOPE are defined as statements which relate to changing one's behaviour, or maintaining the status quo, which are not appropriate to categorise as commitment, reason, desire, need, ability or taking steps statements. These include statements of open hostility toward the clinician and statements which appear to be attempts to avoid the topic of conversation. For example, a client may provide an 'other' statement by saying "did you see the game on TV last night?", when the clinician asked about their drinking behaviour throughout the week. Given the emphasis within this study on positive change, it was felt that 'other' utterances in favour of the status quo would add little value as a stand alone category. As such, these were amalgamated under the general category of 'sustain talk'.

‘Simple reflections’ were retained as a unique category. These are defined within the MI-SCOPE as reflections that add little meaning to what the client has said, often paraphrasing or repeating previous client statements (Martin, Moyers, Houck et al, 2005). For example, if a client was to state “I need to stop drinking, it upsets my girlfriend and parents”, a ‘simple reflection’ of this statement by a clinician may be “You feel you need to quit drinking, as it upsets your girlfriend and family”. ‘Complex reflections’ were also retained as a unique category. These are defined within the MI-SCOPE as reflections that add substantial meaning to what the client has said, by adding emphasis or content not present in the original statement(s) (Martin, Moyers, Houck et al, 2005). For example, in relation to the client statement above, a clinician may provide a ‘complex reflection’ of this utterance by stating “You believe you must stop drinking, as it is damaging your relationships with people who matter to you”. Following a consultation with researchers in this area (personal communication; Amrhein, 2013), it was highlighted that ‘complex reflections’ may play a substantial role in evoking strong commitment to change from clients. As such, this study sought to investigate the potential role of these utterances in evoking client commitment. ‘Complex reflections’ were retained as a unique category, given the unique and crucial role this type of reflection potentially has in evoking strong commitment to change, and actually changing client behaviour (Amrhein, personal communication, 2013; Tollison, Lee, Neighbors et al, 2008).

In addition to this, ask and neutral/follow utterances were included as distinct categories, consistent with the original MI-SCOPE (Martin, Moyers, Houck et al, 2005). ‘Ask’ utterances are defined within the MI-SCOPE as instances where “the client requests information, asks a question, seeks the therapist's advice or opinion” (Martin, Moyers, Houck et al, 2005, pp. 11). An example of this would be a client asking the clinician during an MET session “what do you think I should do to give up drinking?”. ‘Neutral/follow’ utterances are defined as utterances where the client follows the conversational topic set by the clinician, but does not actually address the issue of behaviour change. For example, a client could be said to have provided a neutral/follow utterance by saying “yeah, I saw there was an article in the newspaper today about drinking”, in response to a question from a clinician about information in the media concerning the negative impact of alcohol consumption.

Commitment talk in favour of change was included as a distinct category, with the alteration that the strength of commitment talk be used to create two sub-categories. Specifically, commitment utterances that were in favour of change could

be assigned to the category of weak commitment or strong commitment. This was of crucial importance, as findings from Amrhein indicated that the strength of one's commitment to change is key to predicting behaviour change (Amrhein, Miller, Yahne et al, 2003). Studies following this initial finding from Amrhein, Miller, Yahne et al (2003) suggest that measuring the strength of commitment talk is vital, given the consistent associations demonstrated between strong commitment talk, and readiness to change and outcomes (see Aharonovich, Amrhein, Bisagam et al, 2008; Hodgins, Ching & McEwen, 2009; Perry & Butterworth, 2011). Moreover, Gaume, Bertholet, Faouzi et al (2013) suggest that weaker commitments may be qualitatively distinct from strong commitments, as such that weak commitments represent an attempt by the client to dilute their intention to change. On the other hand, strong commitments are proposed to represent a high level of conviction to change.

In defining what a 'strong' or 'weak' commitment was, criteria followed those previously described and used by Amrhein, Miller, Yahne et al (2003), whereby commitment talk is assigned a 'strength value'. In this study, strength values ranged from +5 (strongest possible commitment to change), to -5 (strongest possible commitment to the status quo). Strong commitments in either direction were those judged to be 4-5 out of a possible 5, whilst 'weak' commitments were those judged as between 1-3 out of 5. Those judged as 0 (i.e. neither toward nor away from change) were categorised as 'neutral/follow' utterances. Whilst such definitions for categorisations may appear somewhat arbitrary, they have been used successfully in other studies. Moreover, to define 'strong' commitments as 4-5 out of 5 represented a high threshold, potentially distinguishing a more useful category than if it was more inclusive. Furthermore, the analysis of inter-rater reliability and rater drift reduced the subjectivity in the coding of strength categories. Guidance within the MI-SCOPE on how to code commitments which were made in past and current tense were not altered for this study (see Martin, Moyers, Houck et al, 2005).

Original MI-SCOPE Codes	New MI-SCOPE Codes
Clinician Codes	
Advise	Advise
Affirm	Affirm
Confront	Confront
Direct	Direct
Simple Reflection	Simple Reflection
Complex Reflection	Complex Reflection
Emphasise Control	Emphasise Control
Feedback	Feedback
Fill	Fill
General Information	General Information
Opinion	Opinion
Open Question	Open Question
Closed Question	Closed Question
Permission Seeking	Permission Seeking
Raise Concern	Raise Concern
Self-Disclose	Self-Disclose
Structure	Structure
Support	Support
Warn	Warn

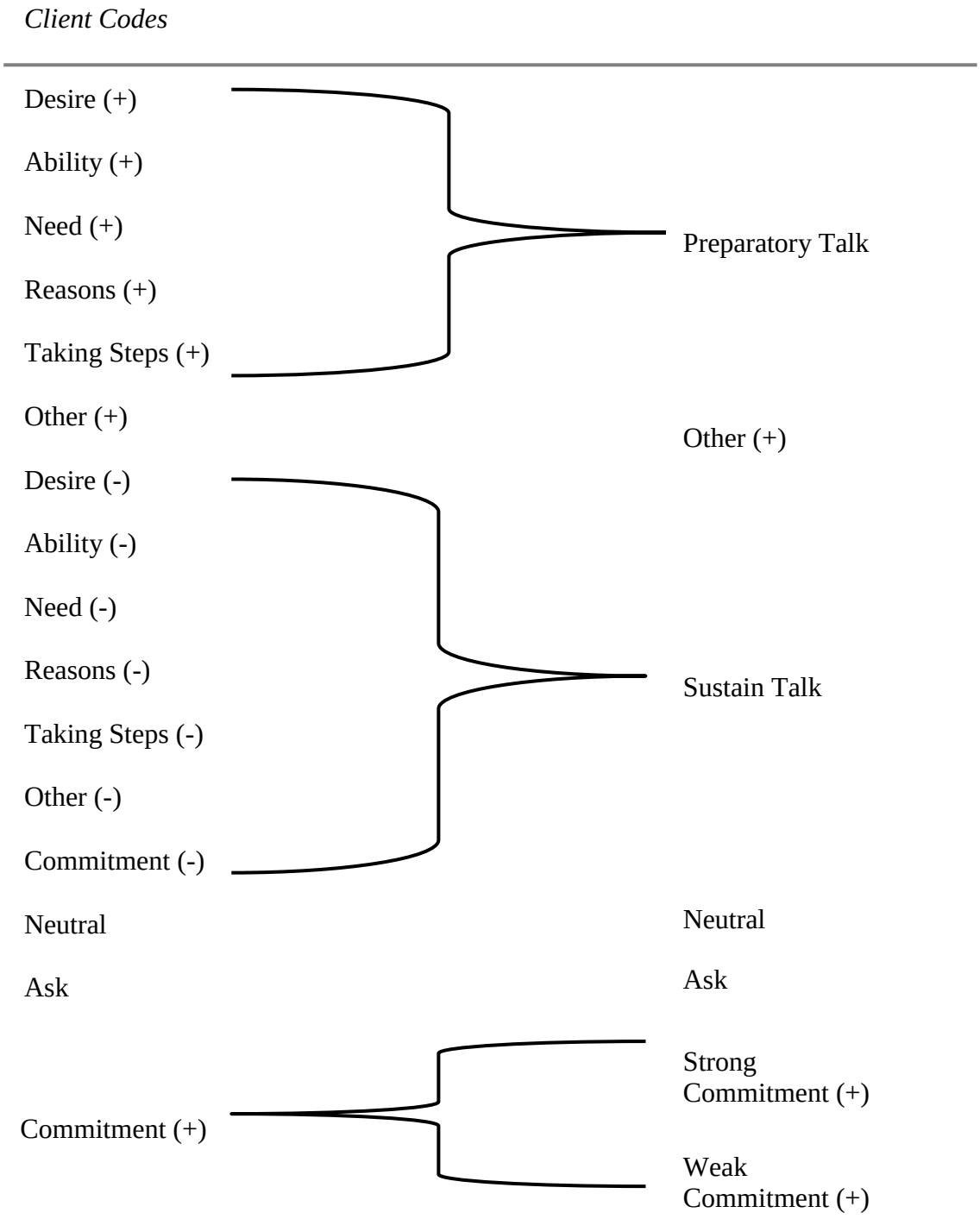

Table 4: Clinician and client categories from the MI-SCOPE (Martin et al, 2005), and how they were adapted for use in the current study

Note: (+) = *for change;* (-) = *for the status quo.*

Selecting categories of client and clinician talk for sequential analyses

Observations were carried out throughout the parsing and coding process, to identify potential patterns of clinician-client interaction of interest. This open-ended selection of interactions significantly influenced later analyses. It ensured that decisions regarding the analysis were not taken just on the basis of preconceived ideas about which interactions may or may not be important in evoking client preparatory talk or strong commitment talk.

These observations were frequently discussed with supervisors to ensure validity and theoretical relevance. This process guided the collapsing of categories which were used in the calculation of transitional probabilities and in regression analyses.

Analyses completed

Recordings which were unsuitable for parsing and coding due to their poor audio quality were excluded from the analysis. Tapes were exhaustively parsed (i.e. parsing produced no gaps between utterances). Following the parsing and coding of sessions in CACTI, a tab-delimited text file was produced, detailing the number, code, start and finish time of each utterance. This data was converted using MATLAB software, into a format which allowed it to be input and analysed in the Generalized Sequential Querier application (GSEQ) (Bakeman & Quera, 1992). GSEQ is an application created specifically for the analysis of sequential observational data. It allows users to compute a range of simple and table statistics (e.g. frequency counts, durations, transitional probabilites) from sequential data.

Transitional probabilities are perhaps one of the simplest statistics that capture the sequential characteristics of data from interactions (Bakeman & Gottman, 1997). In the case of this study, they concerned interactions between clinicians and clients within MET sessions, detailing how behaviour within such interactions was sequenced moment to moment, potentially in repeating patterns.

Transitional probabilities allow one to examine the likelihood that a target event, B, will occur relative to a previous event, A. For example, if one was to examine the probability of a particular sports team winning a game, one could determine the probability that the team won, relative to all the games they played in

the season. Therefore, if the team won 5 times, and played 25 games that season, we could say that the probability of the team winning was 0.20. This is known as an unconditional probability (Bakeman & Gottman, 1997). However, one may wish to examine the probability that the team may win, given that they play in good weather. Therefore, if the team played in good weather 12 times, and on 4 of those days won a game, one would say the conditional probability of a 'target' event occurring (i.e. the team winning) relative to a 'given' event (i.e. good weather) was 0.33. These types of conditional probabilities can be used to examine events occurring at different points in time (as previously discussed). This type of conditional probability is known as a transitional probability (Bakeman & Gottman, 1997), and it was this type of statistical analysis which was used to examine MET session sequences.

Once these transitional probabilities were calculated, it was then possible to examine which ones differed significantly from their expected values using GSEQ (that is- assuming a normal distribution of z-scores-, which z-scores were larger than 1.96, indicating statistical significance at the 0.05 level) (Bakeman & Gottman, 1997). To do this, a z-score for the transitional probability of each type of transition was calculated. This involved comparing the expected value for the conditional probability of each type of transition (see Appendix B), with the observed value of the conditional probability. The resulting z-scores and their statistical significance were calculated for each type of transition, using the 1.96 criterion to establish statistical significance. This occurred for all transition types at both lag one and lag two

Lag one and lag two contingencies describe the arrangement of clinician and client utterances over time (Bakeman & Gottman, 1997). In this study, lag one refers to the time gap between a clinician utterance and the immediately proceeding client utterance. Lag two refers to the time gap between a clinician utterance and the second client utterance which follows it. This concept is illustrated in figure 2.

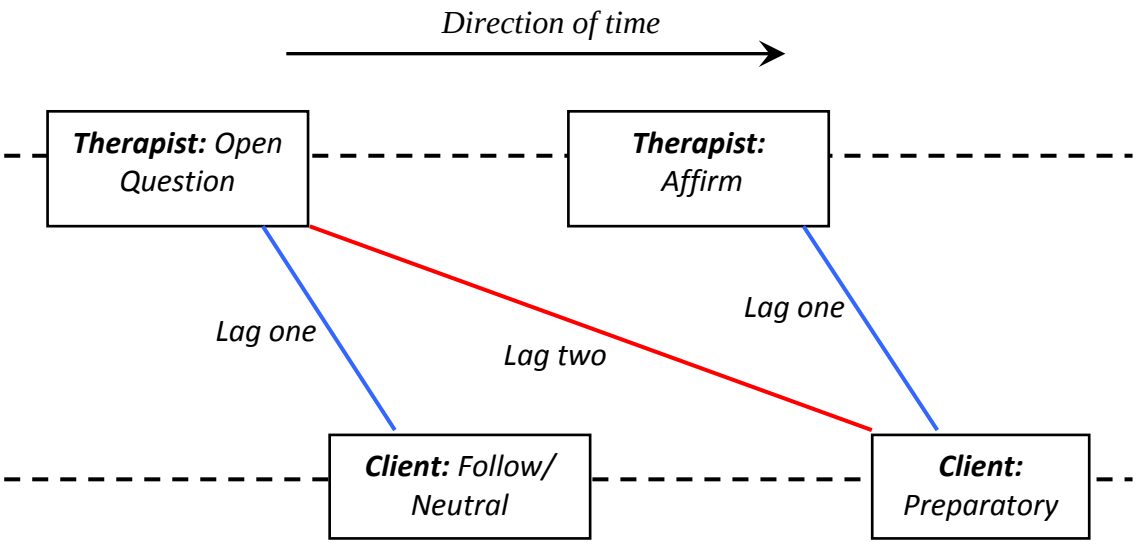

Figure 2: The distinction between lag one and lag two contingencies in sequential data

Lags one and two were both included as part of the analysis in this study. This was done on the basis of observations by Moyers, Martin, Houck et al (2009), who noted that change talk often occurs alongside sustain talk; what they termed a "change talk sandwich" (Moyers, Martin, Houck et al, 2009, pg. 1121). They also found that clinicians' MICO and MIIN behaviours were both associated with client sustain talk. Moyers, Martin, Houck et al (2009) proposed that these findings indicate sustain talk often naturally persists in the face of good clinical practice and increasing change talk. As such, astute clinicians may use client's expressions of sustain talk as opportunities to increase client's motivation, by listening out for the preparatory and commitment talk which occurs alongside it. Due to this finding, it was thought that investigating only lag one interactions may risk highlighting clinical practices which actually evoked preparatory or commitment talk as ineffective, due to the chance presentation of sustain talk at lag one. It may be that in those instances, preparatory or commitment talk occurred afterwards, at lag two. Therefore, to decrease this possibility, lag two contingencies were also analysed.

Only those sequences where a client utterance followed a clinician utterance were analysed. Data were pooled across all participants included in the study. This maximised the possibility that as many cells as possible within the transition matrices for lag one and lag two sequences had expected values of 2-3 or greater (Wickens, 1982; Bakeman & Gottman, 1997). GSEQ was used to calculate the transitional

probabilities for lag one and lag two sequences, following the procedures adopted by Moyers, Martin, Houck et al (2009) (Moyers, personal communication, 2013).

Consistent with the procedures of Moyers, Martin, Houck et al (2009), we then conducted a series of linear regression analyses, using the Statistical Package for the Social Sciences- Version 21.0 (SPSS 21.0). The first of these linear regressions input the clinician utterance categories of MICO, open questions, closed questions, simple reflections and complex reflections as predictors. These were regressed onto the client utterance category of strong commitment. A further linear regression was then conducted. The clinician utterance categories of open questions and complex reflections were input, with these categories being regressed onto the client utterance category of preparatory talk.

Sample size and the power of the analyses

A crucial aspect of any statistical analysis is the concept of power. That is, the likelihood that an analysis will correctly reject the null hypothesis (Harris, 1998). This is typically discussed in terms of the existence of actual relationships between variables of interest, differences among variables, or among means (VanVoorhis & Morgan, 2007). The power of statistical analyses is affected by a range of factors, including: the size of a sample, the types of analyses completed, the violation (or not) of the assumptions underpinning an analysis, and the extent of any error when measuring the dependent variable(s).

The power of sequential analyses

Sequential analyses are dependent on the use of transition matrices, which in this study illustrate the number of times each clinician code preceded each client code, both at lag one and at lag two. The key factors one must consider when determining the power of sequential analyses are the number of events observed, and the distribution of these events throughout the transition matrix (Bakeman & Gottman, 1997). Specifically, if a large number of events were included within a transition matrix, but a small number of the cells in this matrix contained 1 or 2 events, then regardless of the large number of events overall, the power of the sequential analyses

conducted on these cells would be low. This is indicated by the fact that if one sequence was allocated incorrectly to a cell, it is highly likely this would substantially impact the z-score, and therefore the p-value of that cell (see Bakeman & Gottman, 1997). To reduce the impact of such instability on the calculation of z-scores and p-values, such analyses are only conducted when the value of the cell is 5 or greater. This rule is however somewhat arbitrary, as exact guidelines are difficult to define.

When assigning a p-value to the z-score of a particular cell, it is important to determine whether the p-value is actually correct. Again, exact guidelines are difficult to provide. However, Wickens (1989) advises that in larger transition matrices examining multiple categories, up to 20% of cells may have expected frequencies of less than 1. Wickens (1989) also suggests that the total number of events within each transition matrix should be at least 4 to 5 times the number of cells.

In the current study, the data were pooled across participants to increase the statistical power of the analysis (as in Moyers, Martin, Houck et al, 2009). This pooling of data across participants was done to maximise the number of events examined by the analysis (as opposed to analysing each clinician-client dyad individually), and to increase the chance that each cell within the lag one and lag two transition matrices contained a sufficient number of events to meet the criteria of Wickens (1989) (see Appendix C). In addition, by establishing inter-rater reliability prior to the parsing and coding of tapes, and by monitoring rater drift, it was believed that power would be increased by reducing any measurement error of client and clinician categories of interest.

The power of linear regression analyses

There are several suggestions in the literature detailing how one may address the issue of power when conducting a regression analysis. VanVoorhis and Morgan (2007) highlight the difficulties researchers often encounter when trying to ensure an analysis has adequate power. These include limitations in financial resources, restrictions on time and restricted access to adequate sample sizes; the latter of which may be compounded further by strict sampling criteria. They highlight the importance of acknowledging the real-world restrictions researchers must contend with, and how one should balance this with concerns about adequate power (VanVoorhis & Morgan, 2007).

VanVoorhis and Morgan (2007) suggest that when conducting a regression analysis, a helpful rule of thumb is to conduct such an analysis with no fewer than 50 participants. They note that with an increase in the number of independent variables (which in this study, were categories of clinician utterances which acted as predictors), one should seek to increase the sample size. Harris (1985) proposes that when conducting a regression analysis with five or fewer predictors, to ensure adequate power the sample size should exceed the number of predictors by at least 50. For example, if one conducted a regression analysis, regressing five clinician utterance categories onto a single client utterance category, the ideal sample size to ensure adequate power would be at least 55. However, this situation is complicated by the possibility of small effect sizes in the relationships being studied (Tabachnick & Fidell, 1996; VanVoorhis & Morgan, 2007). Specifically, to ensure that small effect sizes are detected, one must increase the sample size further still. Again, VanVoorhis and Morgan (2007) suggest the rule of thumb that, when small effect sizes are anticipated, it is best to have 30 participants per predictor to detect such effect sizes. Using the previous example, this would mean that when regressing 5 clinician utterance categories onto 1 client utterance category, one would ideally have a sample size of 150 participants.

A review of the MI literature reveals that relatively few studies have examined the relationship between clinician and client utterances using regression analyses. Those that have examined this relationship collapsed clinician and client talk under the more general categories of clinician MICO behaviour and client change talk. Using the conventions of Cohen (1988), these studies found a small effect size for the effect of clinician MICO behaviour on client change talk, with Moyers, Martin, Houck et al (2009) reporting an effect size of .36, and Vader, Walters, Prabhu et al (2010) reporting an effect size of .37. It is difficult to generalise these findings to the current study, given that these studies conducted regression analyses with the types of broad categories (e.g. ‘change talk’) that the current study sought to avoid.

Nonetheless, the literature provided a broad indication of the possible effect sizes the current study may uncover, indicating that the regression analyses in the current study may uncover small effect sizes for the predictors. Combining this possibility with the limited sample of the current study (a maximum of 53 participants), and the limited resources available to the authors (e.g. limited time and financial resources), it was possible that the regression analyses of the current study

may be underpowered. The implications of this will be discussed in the strengths and limitations section of the discussion.

Parsing, Coding & Reliability

Training of the Second Coder

Inter-rater reliability was established through the use of a second coder, a researcher (HC) in the Leeds Addiction Unit. HC was selected in light of their significant experience in conducting research into the use of brief psychotherapeutic approaches, including MET, for addictions. HC has extensive experience in the use of process coding frameworks (such as the MI-SCOPE). However, such experience had primarily involved the sequential coding of clinician behaviours. Given the requirement in this study to code both client and clinician utterances, further training was provided.

HC was trained in the use of the adapted MI-SCOPE coding framework and adapted CACTI software by the supervisors of this study and I. Training in the use of the adapted MI-SCOPE manual (henceforth termed the MI-SCOPE manual) used a similar procedure to that used by Gaume, Gmel, Faouzi et al (2008) to establish inter-rater reliability. Specifically, simultaneous coding of UKATT MET recordings was carried out by HC and I to train HC, using recordings excluded from the main study. Discussions of discrepancies during the parsing and coding process took place to increase HC's understanding of the MI-SCOPE. Such discussions continued until HC demonstrated the ability to use the MI-SCOPE proficiently. This proficiency and understanding was said to have been established when there was sufficient agreement between the observations of HC and I. This sufficient agreement was then subjected to testing with the use of inter-rater reliability checks.

Inter-Rater Reliability

None of the 53 recordings selected for use in the main analysis were used for establishing inter-rater reliability between coders. As originally highlighted by Gaume, Gmel, Faouzi et al (2008), establishing inter-rater reliability through the analysis of utterance-to-utterance agreement between coders would not have been

possible in this study. This was due to the fact that the coders were parsing utterances independently of each other, and so may have parsed the same session differently. However, as noted by Gaume, Gmel, Faouzi et al (2008), if two independent raters demonstrate agreement on two specific variables, it could be assumed that clinician-client interactions were parsed and coded with sufficient reliability. These variables are the number of times each code is assigned, and the number of times each type of transition between clinician and client are assigned. Inter-rater reliability for each MI-SCOPE code and for each type of transition was estimated with the Intraclass Correlation Co-efficient (ICC; Shrout & Fleiss, 1979). The standard of such intra-class correlations was determined using the criteria outlined by Cicchetti (1994).

Establishing Inter-rater reliability

The process of randomly selecting recordings from the UKATT database continued until sufficient inter-rater reliability was established and maintained between coders. Statistical analyses were completed using SPSS 21.0 to calculate intra-class correlation co-efficients. Intra-class correlations were calculated between coders, for both the number of MI-SCOPE codes assigned and the number types of transitions assigned.

Data from both coders concerning the frequency with which codes and types of transitions were assigned were used to improve inter-rater reliability between each analysis. Discussions occurring between each analysis were intended to allow HC and I (who approached the process of parsing and coding from different professional backgrounds) to discuss discrepancies in the data. The aim of this process was to rectify any inconsistencies between coders, through reference to the MI-SCOPE manual (Martin, Moyers, Houck et al, 2005) and reflections on decision making processes (see the ‘reflections on the process of establishing inter-rater reliability’ section for further details).

Rater Drift

As highlighted by Dallos (2006), when using established coding frameworks, a threat to validity and reliability is the phenomenon of rater drift, whereby the rater using the coding framework alters their use of it as time passes. This may occur as the rater

forms hypotheses about the nature of interactions being coded, which then biases the codes they assign as they anticipate what they will see next. In addition, raters may become more proficient in the use of the coding framework as they become experienced in its use. As a result, one may see differences in how codes are assigned when comparing data from the start of the analysis process with data from later on in the analysis process (Dallos, 2006). With CACTI, this threat to validity and reliability is particularly prominent. This is due to the fact that rater drift in either parsing or coding could impact upon the frequency of codes and transitions.

To address this issue, HC and I parsed and coded an additional MET recording, randomly selected from the UKATT database. The parsing and coding of this recording was completed at the half-way point of the analysis process of the main sample (i.e. when exactly half of the sample recordings had been parsed and coded). At this point, tapes would have been randomly selected from the UKATT database until rater drift had been corrected, through the demonstration of sufficient levels of inter-rater reliability. This procedure would have ensured that any drift which had occurred had been corrected.

The statistical method for assessing rater drift was the same as that used to assess inter-rater reliability. Specifically, through conducting intra-class correlations co-efficients (Shrout & Fleiss, 1979) in SPSS 21.0, using data concerning the frequency of MI-SCOPE codes assigned and the number types of transitions assigned (see Gaume, Gmel, Faouzi et al, 2008). The standard of such intra-class correlations was again determined according to the criteria outlined by Cicchetti (1994).

Reflections on the process of establishing inter-rater reliability

The process of establishing inter-rater reliability showed differences in the use of the coding framework. Discussions around the assignment of specific codes and how HC (an academic researcher) and I (a Clinical Psychologist in Training) arrived at specific conclusions, highlighted issues with the coding process. In addition, the process of parsing and coding recordings revealed interesting issues concerning how HC and I came to assign strength ratings for commitment utterances. These issues are discussed here, as they may help other researchers to consider some of the complexities of the parsing and coding process, and how inter-rater reliability may be complicated by the raters involved in a study.

One prominent theme during the coding process was how HC and I made inferences about which specific codes we assigned. Through discussion it became clear that HC, being of an academic background, interpreted events within MET sessions in an isolated manner. That is, utterances were interpreted without consideration of how the surrounding context (what had been said prior to a specific utterance, and the more general theme of conversation) could inform the meaning the speaker was attempting to convey, and therefore ultimately determine the category an utterance was assigned. On the other hand, I interpreted utterances with reference to the surrounding context (whilst still referring to the strict definitions within the MI-SCOPE), as I found that previous utterances, and the theme of the discussion surrounding an utterance, could help inform the categorisation process. This distinction in how codes were assigned between raters was attributed to our different professional backgrounds. Indeed, clinicians in many therapeutic approaches are often advised to attend to the context and previous content of discussions, to infer the meaning of client statements. It is logical that someone who has not undergone training in psychological therapy approaches would therefore not use such contextual information to inform the assignment of codes.

A key issue discussed between HC and I was the effect that alternative methods of assigning codes to utterances could have upon the findings of this study. The use of a more 'clinical' method, which uses aspects of clinical skills in the interpretation of session utterances, may produce lower inter-rater reliability, though this method may produce results which are more clinically relevant. That is, the codes and sequences assigned, and the results of the analysis, would be based on an interpretation of therapeutic events more consistent with a clinician's perspective. However, a more academic approach, viewing utterances in strict isolation and using very literal interpretations to assign codes, may produce higher inter-rater reliability (given the very limited role for clinical interpretation). The downside of this approach would be that the codes and sequences assigned, and therefore the results obtained, may be less clinically relevant. As such, it was apparent to both HC and I that considering the backgrounds of raters who are assigning codes to therapeutic events is important, not only for inter-rater reliability purposes, but also in terms of the clinical implications of the findings.

A rough guideline was established in order to create a middle ground between the contrasting methods of understanding therapy utterances. In essence, if a rater from a clinical background believes that they are over-analysing the content of a

client's or clinician's utterance, and is attempting to make the utterance 'fit' a particular category, it is likely that clinical skills are confounding the coding process. In such an instance, the clinician should refer more strictly to the guidance of the coding manual, and attend to the content of the utterance as the sole source of information.

A similar issue arose for HC, who noted a tendency to repeatedly assign a 'neutral' code, even when utterances occurred in the context of discussions about changing or not changing. This was highlighted as being due to the fact that HC believed that the client wasn't strictly speaking about stopping drinking or continuing drinking in the exact utterance being coded. For example, if the utterance in question wasn't directly indicating commitment, need, or some other state against change or in favour of change, then it would be coded as 'neutral'. This often occurred out of concern for maintaining the validity of the coding process. However, in such instances the content of adjacent utterances clearly indicated that the client's utterance was a positive or negative utterance which was directly related to their drinking behaviour. For example, a client may have noted that they planned to distract themselves more often with reading, as the previous utterance indicated that they felt distraction techniques would be a useful means of reducing the urge to drink. Therefore, we can define this utterance as a commitment (see Martin, Moyers, Houck et al, 2005). However, if one was to strictly assign codes utterance by utterance, such a comment would be viewed as neutral, given it did not directly concern drinking.

Another guideline to address such an issue was to discuss these neutral ratings with a clinician experienced in the field of MET/MI and addictions. Indeed, it was apparent from the results of the inter-rater analysis that discussions which focused upon improving consistency amongst raters, but which did not adhere to any strict framework or process to guide such discussions, could substantially improve inter-rater reliability.

Another noteworthy point concerns how HC and I decided what strength commitment utterances had. As noted previously, the context around an utterance was found to be crucial in assisting the assignment of codes. However, the context around an utterance was also crucial in assigning a particular strength rating to client's commitment utterances. For example, if prior discussions had included information about all the negative aspects of drinking for the client, which were then summed up by a complex reflection from the clinician, it was likely that a definitive statement from the client of 'I've had enough, I am going to stop drinking' would be judged as a

strong commitment by both HC and I. As such, the nature of the content surrounding the utterance was key to how it was interpreted and coded.

However, another source of information which helped with the assignment of strength values was the parsing process. CACTI demands that coders parse a recording before codes can be assigned. This provides an opportunity for the rater to become familiar with the session, including the nuances of how the client uses speech and language to convey meaning. This information is incredibly helpful, as the rater can then judge utterances with reference to how that specific client may use intonation, specific words, the rate of their speech, or other aspects of speech and language to convey meaning. Indeed, in some ways the parsing process is not too dissimilar from a first psychotherapy session, during which clinicians often become familiar with the subtleties of how clients express themselves. This increased familiarity often helps clinicians engaged in psychotherapy with a client, to accurately interpret comments and events which occur in subsequent therapy sessions. It is intriguing that such a process was felt to apply so readily to the assignment of commitment strength values. As such, it is believed that future studies using methods similar to that used in the current study, should be aware of the benefits such increased familiarity brings to the judgement of utterance strength.

Ethics

A proportionate review was sought in order to gain NHS ethical approval. Participants of the original UKATT study, as part of their participation, provided informed consent for the use of their session recordings in subsequent research. All procedures concerning the selection and analysis of data originally obtained as part of the UKATT study, were approved by the NHS East of Scotland Research Ethics Service.

Results

Amendments to Recording Selection

In the MET arm of UKATT, the clinician's role in session one is that of providing personalised feedback on a range of measures, such as results from participant's Y - glutamyl transferase (GGT) test, scores on the Leeds Dependence Questionnaire, and Alcohol Problems Questionnaire (UKATT Research Team, 2001). Participants attended this session in week one. A discussion often occurred whereby the client was invited to provide their reactions to such feedback. The second session involved no provision of feedback, and occurred in week two of the intervention, and could be viewed as a therapy session which used an MET approach. The final session was considered a follow-up session, and occurred within week 8 of the intervention; all 3 sessions were anticipated to last 50 minutes (UKATT Research Team, 2001).

Whilst the first session was originally selected for sampling on the basis that it provided the potential for the highest sample, and may have served as a context for increasing motivation to change, piloting found this to be untrue. Observations throughout the parsing and coding process revealed that participants' first session generally did not contain as much preparatory and commitment talk as originally predicted. On average, first sessions contained substantially less preparatory and commitment talk than the second session of the MET intervention. My own reflections on the process of parsing and coding, and subsequent discussions with supervisors, indicated that the first session mainly involved the provision of personal feedback to participants about their drinking (see UKATT Research Team, 2001). Whilst some discussions in the first session resulted in preparatory talk, these discussions tended to be brief, with clinicians rarely eliciting commitment to change.

On the other hand, participants' second sessions contained much more frequent and prolonged discussions with the clinician about change. Such changes had often been made by the client between sessions one and two. Whilst these discussions often involved a degree of ambivalence from the client, clinicians often managed to elicit preparatory and commitment talk throughout the session. From observations, the third MET session often acted to reinforce client's commitment to change, which had originally been made in session two. This process of reinforcing commitment often took the form of creating a longer term plan for change. The process of creating this

plan did not evoke preparatory talk and/or commitment talk as frequently as occurred in the second MET session.

Whilst it is beyond the scope of this study to consider potential hypotheses for these trends, reflections from the supervisors of this study were that following the presentation of feedback to clients, ambivalence would likely be increased. Therefore, in the second session, clinicians could engage in discussions with clients concerning any changes they had made, with a view to increasing dissonance and then resolving this through further commitment to change. The third session would then likely serve as an opportunity to follow-up on additional changes the client had made between sessions two and three, and to create a longer term change plan.

It is on the basis of these reflections and observations that the protocol for the selection of tapes was changed. Participants' second sessions were selected as the primary session of interest. Should the second session be unavailable, observations indicated that the first session should be the next session of interest, due to the presentation of feedback and potential for preparatory and commitment talk, relative to the third session. The third session was only chosen if both the first and second sessions were not available, or unsuitable for use due to poor audio quality. This decision was based on the observation that the third session often contained a lower level of commitment and preparatory talk relative to sessions one and two.

Amendments to Participant Selection

Upon examination of the UKATT database at the Leeds Addiction Unit, it was apparent that 14 participants' recordings of the original sample of 53 had been lost (assumedly during their transit from UKATT study centres to the Leeds Addiction Unit database). Moreover, a further 7 participants' recordings were of insufficient audio quality to allow their use, resulting in a remaining total of 32 participants whose recordings were both available and suitable for use. Due to time constraints, and the fact that I was the only individual parsing and coding the recordings selected, 12 participants' recordings were not used in this study. Therefore, the final sample was made up of 20 participants, from which 20 separate sessions were sampled; 1 from each participant. Of these, 3 were participants' 3rd session recordings, 13 were 2nd session recordings, and 4 were 1st session recordings. This amended participant selection process is illustrated in figure 3.

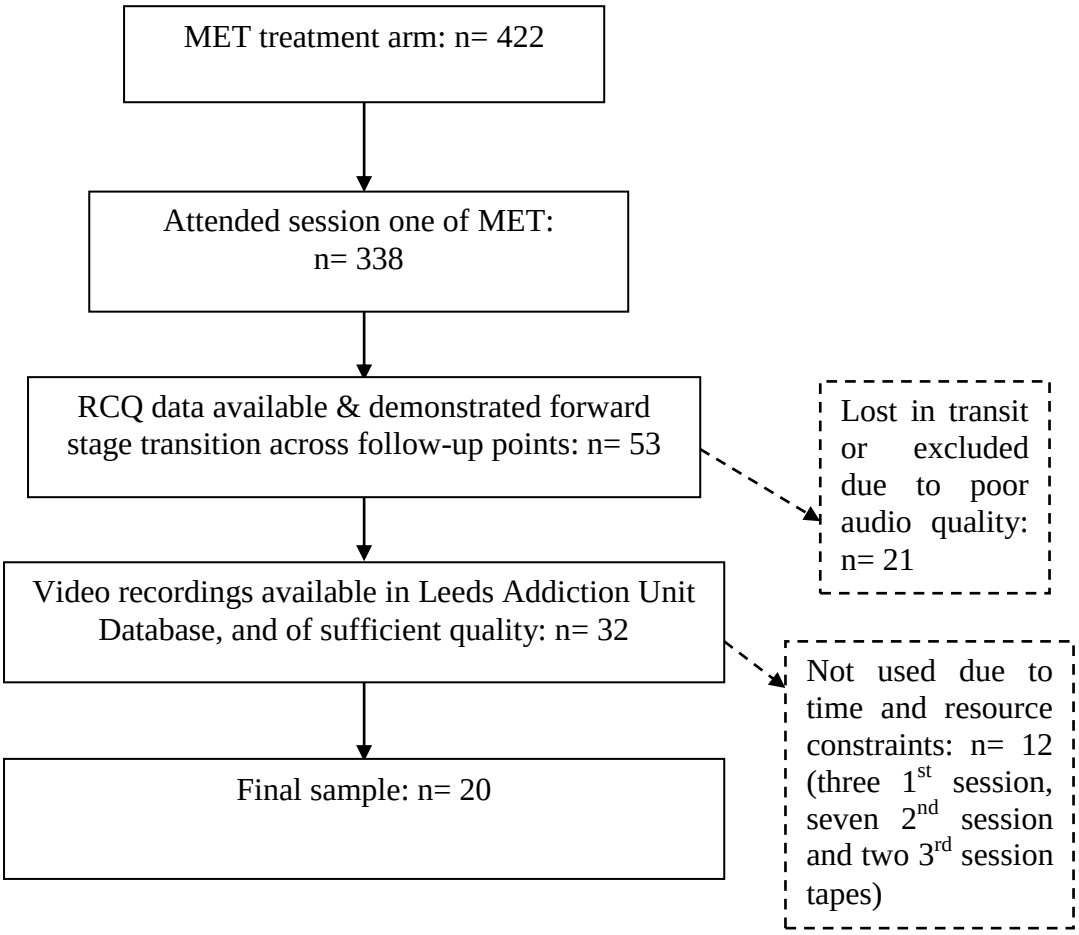

Figure 3: Updated flowchart of participant included in the current study

Preliminary Analyses

In order to ensure that sequential analyses of MET therapy sessions could be conducted, it was necessary to consider whether the expected frequencies would be high enough amongst a sufficient proportion of the cells within the transition matrices. Wickens (1989) advises that within larger transition matrices with more categories, a maximum of 20% cells should have expected frequencies of less than 1. For smaller 2x2 transition matrices, all expected frequencies should be above 2-3. In addition, Wickens (1989) suggests that the total number of events analysed should be at least 4 to 5 times the number of cells in the transition matrix. However, absolute guidelines are difficult to define (Bakeman & Gottman, 1997). In the current study, such guidelines were adopted to the effect that sequential analyses would only be conducted if expected frequencies were equal to, or above the level suggested by

Wickens (1989), and the total number of observed events analysed by the sequential analysis were 4 to 5 times the number of cells in the transition matrices.

Preliminary analyses were conducted using GSEQ (Bakeman & Quera, 1992). If the expected frequencies were sufficiently high, this would permit the use of the original client and clinician utterance categories used in this study, without collapsing them (the results of this analysis are included in Appendix B). Analyses revealed that whilst the number of observed events was sufficiently high to meet the criteria of Wickens (1989) (see Appendix C), more than 20% of cells within the transition matrices for lag 1 and lag 2, had expected frequencies lower than 1.

Collapsing Categories

In order to increase the expected frequencies of cells within the transitions matrices, I followed previously established methods for collapsing coding categories. Specifically, that categories should be collapsed according to theoretical considerations in the literature, and practical issues (Miller, 2000; Moyers, Martin, Houck et al, 2009). Of central interest were the roles of specific categories of clinician utterances in evoking client's strong commitment utterances and preparatory utterances. Therefore, the following amendments were made to the coding categories integrated into CACTI for this study. These collapsed clinician and client categories were later used in the analyses of MET session sequences.

Clinician Categories

In the previous literature, complex reflections and simple reflections have been demonstrated to have contrasting effects on client's drinking behaviour (see Tollison, Lee, Neighbors et al, 2008). In addition, discussions with Amrhein revealed that complex reflections may have a crucial role in evoking client's strong commitment talk (Amrhein, 2013, personal communication). Specifically, Amrhein hypothesised that complex reflections, when used skilfully and at the appropriate moment, could trigger strong commitment to change. Therefore, the specific utterance categories of 'Simple Reflections' and 'Complex Reflections' were considered worthy of further investigation. Given the very small number of instances of specific types of complex

reflections (e.g. double-sided reflections) in the data set, it was necessary to form a general ‘Complex Reflection’ category, comprised of the individual sub-categories of complex reflections as defined in the MI-SCOPE (see Martin, Moyers, Houck et al, 2005)

Open questions have also demonstrated some promise within the literature, in terms of promoting contemplation of change (see Bertholet, Faouzi, Gmel et al, 2010; Miller & Rose, 2013; Tollison, Lee, Neighbors et al, 2008), whilst closed questions have previously been found to have a potentially detrimental effect. In addition, interactions which focus upon evoking client’s preparatory talk have been found to be useful when working with clients who are ambivalent about change (Miller & Rose, 2013). Given the evidence in the literature, and the adequate expected frequencies for the ‘Closed Question’ and ‘Open Question’ categories, they were not collapsed.

Due to low expected frequencies, the categories of ‘Affirm’, ‘Emphasise Control’, ‘Feedback’, ‘General Information’, ‘Permission Seeking’, ‘Raise Concern’ and ‘Support’ were collapsed into the general category of ‘Motivational Interviewing Consistent’ (‘MICO’) behaviour, given that such behaviours are advised within MI and MET literature and have been integrated into comparable categories in similar studies (see Miller & Rollnick, 2013; Miller, Sovereign & Krege, 1988; Moyers, Martin, Houck et al, 2009; UKATT Research Team, 2001). The clinician utterance categories of ‘Advise’, ‘Confront’, ‘Direct’, ‘Opinion’ and ‘Warn’ were collapsed due to similarly low expected frequencies, into the general category of ‘Motivational Interviewing Inconsistent’ (‘MIIN’) behaviour. Again, such a category is consistent with the MI literature, in that such behaviours are generally accepted as being contrary to the spirit and specific practices promoted within MI. The remaining categories of ‘Self-Disclose’, ‘Fill’ and ‘Structure’ were excluded from any sequential analyses, due to the lack of any empirical support in the MI literature for their role in evoking client preparatory talk or strong commitment talk. These general clinician categories, and the sub-categories collapsed to create them, are summarised in table 5:

Collapsed Category	Constituting Sub-Categories
Simple Reflection	Simple Reflection.
Complex Reflection	Complex Reflection, Double-sided reflection, Amplified Reflection, Continuing the Paragraph, Metaphor and Simile, Reflection of Feeling and Reframe
Open Question	Open Question
Closed Question	Closed Question.
MICO	Affirm, Emphasise Control, Feedback, General Information, Permission Seeking, Raise Concern and Support
MIIN	Advise, Confront, Direct, Opinion and Warn

Table 5: Clinician categories created from the collapsing of sub-categories, as defined in the MI-SCOPE (Martin, Moyers, Houck et al, 2005).

Client Categories

As previously noted, research such as that by Amrhein, Miller, Yahne et al (2003) and Gaume, Bertholet, Faouzi et al (2013) indicates that strong commitment utterances by clients are a possible precursor to positive behaviour change. In the present study, commitment utterances were subdivided in a similar manner to previous studies, in that ‘Strong Commitment’ talk and ‘Weak Commitment’ talk were individual categories. Given the inconsistency with which previous studies have linked the categories of positive ability, reason, desire, need and taking steps utterances to client behaviour change and increased commitment (see Table 2), these categories were collapsed into the more general category of ‘Preparatory Talk’. Positive other statements were also added to the general category of ‘Preparatory Talk’. Moreover, negative commitment, and ability, reason, desire, need, taking steps and other utterances in favour of the status quo were collapsed under the general category of

'Sustain Talk'. This was done on the rationale that this study was not primarily concerned with what clinicians do to maintain the client's status quo, and that there are similar precedents in the literature (see Table 2). Neutral and ask were collapsed under the category of 'Neutral'. This again is consistent with precedents in the literature (e.g. Moyers, Martin, Houck et al, 2009). These general categories, and the sub-categories which were collapsed to create them, are summarised in table 6:

Collapsed Category	Constituting Sub-Categories
Strong Commitment Talk	Strong Commitment (+)
Weak Commitment Talk	Weak Commitment (+)
Preparatory Talk	Ability (+), Reasons (+), Desire (+), Need (+), Taking Steps (+), Other (+).
Sustain Talk	Strong Commitment (-), Weak Commitment (-), Ability (-), Reasons (-), Desire, Need (-), Taking Steps (-), Other (-).
Neutral	Neutral, Ask

Table 6: Client categories created from the collapsing of sub-categories, as defined in the MI-SCOPE (Martin, Moyers, Houck et al, 2005).

Inter-rater reliability

Establishing Inter-rater reliability

Sessions which were sampled for the main study were not used to establish inter-rater reliability. This was done in order to prevent any potential confounding effects on the parsing and coding process. A total of three session recordings were sampled from the MET arm of the UKATT database, for the purpose of establishing inter-rater

reliability. Of these 3 recordings, 2 were 3rd MET sessions and 1 was a 2nd MET session.

Raters had to demonstrate excellent ICC coefficients as defined by Cicchetti (1994), and maintain high rates of inter-rater reliability across more than one session recording. This conservative method of establishing inter-rater reliability was advised by the supervisors of this study, on the rationale that reliable methods of parsing and coding should be established not only between raters, but also across sessions. Inter-rater analyses used a two way mixed model, investigating absolute agreement between raters. As noted previously, inter-rater analyses investigated two variables; namely, the frequency of times each code was assigned by raters, and the number of times raters coded for particular transitions between clinician and client categories. The first session recording randomly sampled for the analysis of inter-rater reliability was a participant's 3rd MET session. The results of this inter-rater reliability analysis are shown in table 7.

Variable	*ICC*	95% *CI*	*F*	d.f.
C. Frequency	.68	[.29, .69]	3.31	53
T. Frequency	.83	[.76, .88]	5.96	139

Table 7: Intra-class correlations for code frequencies and transition frequencies; first inter-rater analysis

Note: C. Frequency- Code Frequency; T. Frequency- Transition Frequency; ICC- Intra-class correlation coefficient; 95% CI- 95% Confidence Interval; F- F value, d.f.- degrees of freedom.

Results of the first inter-rater analysis revealed that the ICC coefficient for the frequency of types of transitions between clinician and client was sufficiently high (ICC= .83) to meet the criteria for an 'excellent' ICC coefficient (Cicchetti, 1994). However, the extent of agreement between raters on the number of times each code was assigned was only sufficient to be regarded as 'good' (ICC= .68). As such, HC and I met to discuss the process of parsing and coding, with the intention of

improving inter-rater reliability. We used data from HC and I concerning the frequency with which transitions and codes were assigned, specifically focusing upon categories where agreement appeared lowest. Sections of the recording parsed and coded by HC and I were then played again, with a focus upon sections containing several examples of the transition or code for which agreement was lowest. Following this, we discussed reasons for the assignment of particular codes or transitions, with the aim of improving agreement by rectifying errors by either rater. During these discussions, we continuously referred to the MI-SCOPE (Martin, Moyers, Houck et al, 2005) to prevent any unintentional drift from the definitions of client and clinician codes.

Following these discussions, we randomly sampled a further MET session recording from the UKATT database, with HC and I separately parsing and coding this recording for inter-rater analysis. This recording was of a participant's 3rd MET session. The results of this analysis are shown in table 8.

Variable	*ICC*	95% *CI*	*F*	d.f.
C. Frequency	.89	[.67, .88]	8.52	53
T. Frequency	.87	[.82, .91]	7.84	139

Table 8: Intra-class correlations for code frequencies and transition frequencies; second inter-rater analysis

Note: C. Frequency- Code Frequency; T. Frequency- Transition Frequency; ICC- Intra-class correlation coefficient; 95% CI- 95% Confidence Interval; F- F value, d.f.- degrees of freedom.

Results of the second inter-rater analysis revealed that the ICC coefficient for both the frequency of types of transitions, and the frequency with which each code was assigned, was sufficiently high to meet the criteria for 'excellent' ICC coefficients (Cicchetti, 1994). Following this result, HC and I met again to discuss the results of this analysis, using the same procedure for discussion as used following the first inter-

rater analysis. The purpose of these discussions was to maintain and where possible improve inter-rater reliability.

Following these discussions, a third session recording was randomly sampled from the UKATT database, excluding participants already chosen for the main study. This recording was of a participant's 2nd MET session. HC and I separately parsed and coded this recording, with data concerning transition frequencies and code frequencies being analysed using the procedures outlined previously. The results of this inter-rater analysis are reported in table 9:

Variable	*ICC*	95% *CI*	*F*	d.f.
C. Frequency	.93	[.73, .94]	13.67	26
T. Frequency	.94	[.91, .95]	15.41	139

Table 9: Intra-class correlations for code frequencies and transition frequencies; third inter-rater analysis.

Note: C. Frequency- Code Frequency; T. Frequency- Transition Frequency; ICC- Intra-class correlation coefficient; 95% CI- 95% Confidence Interval; F- F value, d.f.- degrees of freedom.

Results of the third inter-rater analysis revealed that the ICC coefficients for both the frequency of types of transitions, and the frequency with which each code was assigned by raters, was sufficiently high to meet the criteria for 'excellent' ICC coefficients (Cicchetti, 1994). As such, the criteria of establishing and maintaining excellent inter-rater reliability across sessions were met.

Rater drift

Once raters have been trained, and inter-rater reliability has been established, a common phenomenon observed when using behavioural coding frameworks is rater drift. This occurs when a rater is required to engage in some form of observation of

behaviour, and begins to depart from previously established and agreed methods for coding those observations (Kaplan & Saccuzzo, 2012). This results in the same behaviour being rated differently over repeated occasions. Given the use of a single rater in this study, it was agreed with supervisors that preventing rater drift would be an important element of the analysis.

HC randomly selected an MET session not included in the main sample of the study, from the UKATT database. This MET session was parsed and coded separately by us both; specifically, when I had parsed and coded half of the study sample (i.e. 10 participants' MET sessions). This would provide an indicator of whether I had demonstrated significant drift from established methods for parsing and coding session tapes during the analysis process. Inter-rater reliability was estimated with the intraclass correlation co-efficient (ICC; Shrout & Fleiss, 1979). The standard of such intra-class correlations was determined, as before, according to the criteria outlined by Cicchetti (1994).

The assumption underlying this analysis was that given HC's lack of exposure to session recordings following the establishment of inter-rater reliability, HC would have demonstrated negligible drift with regards to adherence to the established methods for parsing and coding. As such, if we demonstrated sufficient inter-rater agreement in the number of utterances assigned each code, and in the number of transitions of each type between clinician and client (see Gaume, Gmel, Faouzi et al, 2008), then it could be said that I still demonstrated sufficient adherence to the MI-SCOPE.

Intra-class correlations were conducted, with an excellent intra-class coefficient being reported for the frequency of types of transitions between clinician and client (ICC= .79), and an excellent intra-class coefficient being reported for the number of utterances assigned each code (ICC= .76). As such, it was demonstrated that no significant rater drift had occurred since the beginning of the parsing and coding of sample sessions, with regard to either variable. These results are summarised in Table 10.

Variable	*ICC*	95% *CI*	*F*	d.f.
C. Frequency	.76	[.49, .89]	4.29	26
T. Frequency	.79	[.71, .85]	4.82	139

Table 10: Intra-class correlations for code frequencies and transition frequencies.

Note: C. Frequency- Code Frequency; T. Frequency- Transition Frequency; ICC- Intra-class correlation coefficient; 95% CI- 95% Confidence Interval; F- F value, d.f.- degrees of freedom.

Descriptive Statistics

Descriptive statistics were calculated for the collapsed client and clinician categories using SPSS 21.0, pooling data across all sessions. The descriptive statistics for collapsed clinician and client categories are shown in tables 11 and 12 respectively:

Category	*f*	Min	Max	*M*	SD
Closed Question	438	5	44	21.90	11.04
Open Question	501	5	58	25.05	14.57
Simple Reflection	689	13	56	34.40	12.49
Complex Reflection	813	13	79	40.65	16.91
MICO	637	1	119	31.85	28.43
MIIN	166	0	19	8.30	5.13

Table 11: Descriptive statistics for collapsed clinician categories, pooling data across all sessions.

Note: f- frequency of the code across all sessions, Min & Max- Minimum and Maximum number of times each code occurred in any of the sessions, M- Mean number of times the code occurred across all sessions, SD-Standard Deviation of the code across all sessions.

Descriptive statistics were calculated from the 20 session recordings. These demonstrated that, on average, clinicians used more open questions than closed questions, which is consistent with the principles of MI practice (see Bertholet, Faouzi, Gmel et al, 2010; Miller & Rollnick, 2013). In addition, on average clinicians used more complex reflections than simple reflections, and demonstrated much higher use of MICO behaviours, as compared to MIIN behaviours. The former finding is the opposite of that obtained by similar studies using comparable means of clinician selection and supervision (see Moyers, Martin, Houck et al, 2009). However, the latter finding is consistent with comparable studies, and would be expected in a study such as UKATT, whereby highly trained and experienced therapists were selected for the trial and were provided with intensive supervision (UKATT Research Team, 2001). Interestingly, MIIN behaviours still occurred, indicating that even clinicians with a high level of training and supervision engage in behaviour contrary to advised MI practice.

The descriptive statistics indicated that most categories of utterance had a wide range, with the exception of the MIIN category (unsurprising given the rarity with which it occurred). Standard deviations indicated that clinicians varied most in their use of MICO behaviours, partly reflecting the high frequency with which these behaviours occurred in the data set.

Category	*f*	Min	Max	*M*	SD
Strong Commitment	137	0	23	6.85	7.30
Weak Commitment	150	1	19	7.50	5.03
Preparatory Talk	1579	35	129	77.95	26.50
Sustain Talk	691	4	74	34.55	20.52
Neutral	1846	33	200	92.30	39.23

Table 12: Descriptive statistics for collapsed client categories, pooling data across all sessions.

Note: f- frequency of the code across all sessions, Min- Minimum number of times each code occurred in any of the sessions, Max- Maximum number of times each code occurred in any of the sessions, M- Mean number of times the code occurred across all sessions, SD-Standard Deviation of the code across all sessions.

Descriptive statistics for client categories demonstrated that, on average, clients provided more weak commitments than strong commitments. In addition, both commitment categories occurred much more rarely than the preparatory talk category. This is consistent with previous findings from similar studies (see Gaume, Bertholet, Faouzi et al, 2013), and is not surprising given the greater number of sub-categories which constituted preparatory talk. Interestingly, sustain talk occurred much less frequently than preparatory talk, which likely reflects the criteria for participant sampling in this study (participants demonstrated increased readiness to change following the intervention), and the strict criteria UKATT adopted in selecting and supervising clinicians (see UKATT Research Team, 2001). Neutral utterances were the most frequent category on average.

As with the clinician categories, there was substantial variability across sessions, for all utterance categories. The neutral and preparatory talk categories demonstrated the greatest variability.

Research Aim & Hypotheses Revisited

The aim of this study was to investigate whether specific categories of clinician utterances predicted client's preparatory talk and strong commitment talk. Two hypotheses arose from a review of the previous literature. These were that complex reflections by clinicians would be associated with, and predictive of strong client commitment talk, and that open questions by clinicians would be associated with, and predictive of preparatory talk. In order to test these hypotheses, a sequential analysis was first conducted to examine transition probabilities within MET sessions.

Sequential Analysis

Transitional probabilities were calculated using GSEQ (Bakeman & Quera, 1992). GSEQ was also used to calculate the statistical significance of each transitional probability. Transitional probabilities were calculated for collapsed categories of client and clinician utterances. The transitional probabilities for lag one and lag two are outlined in tables 13 and 14 respectively.

Initial Clinician Utterance	Subsequent client utterance at lag one				
	WCOM	SCOM	PREP	SUST	NEUTRAL
SREF	.03	.02	.33	.14	.48
CREF	.04	.04	.42**	.10†	.41††
OQ	.04	.03	.51**	.14	.28††
CQ	.02	.02	.22††	.11	.63**
MICO	.02	.05	.31	.09	.52*
MIIN	.04	.02	.18††	.15	.61**

Table 13: Transition matrix for lag one interactions, showing the transitional probabilities between each clinician utterance category, and each client utterance category.

*Note: The transitional probabilities shown in Table 13 indicate the probability that if a specific clinician (row) category occurs, the next category of speech will be the client (column) category. For example, given that a clinician provided a simple reflection (represented by the acronym SREF in the first row), the first column along (WCOM) gives the conditional probability that the next utterance will be a client utterance in the category of weak commitment (represented by the acronym WCOM). SREF- simple reflection; CREF- complex reflection; OQ- open question; CQ- closed question; MICO- motivational interviewing consistent behaviour; MIIN- motivational interviewing inconsistent behaviour; WCOM- weak commitment; SCOM- strong commitment; PREP- preparatory talk; SUST- sustain talk; NEUTRAL- neutral talk. Equal to, or more probable than expected by chance at the 0.05 level- *; equal to, or more probable than expected by chance at the 0.01 level- **. Equal to, or less probable than expected by chance at the 0.05 level- †; equal to, or less probable than expected by chance at the 0.01 level- ††.*

Examination of lag one transitional probabilities revealed that no category of clinician utterance was significantly more likely than chance to elicit weak or strong client commitment utterances. This finding may be attributable to the fact that it is more difficult to accurately approximate the p value for a transitional probability if certain assumptions are not met. Specifically, if for a particular cell the frequency of the 'given' utterance (pooled across the data set) is not above 30, or the ratio of the expected frequency, over the actual frequency of the 'given' utterance (pooled across the dataset), is not between > 0.1 and <0.9, it is more difficult to accurately determine the true p value (Haberman, 1979).

At lag one complex reflections and open questions were significantly more likely than expected by chance to elicit preparatory talk from the client (p= <.01). In addition, MIIN behaviours and closed questions were significantly less likely to elicit preparatory talk from the client (p= <.01). Complex reflections were significantly less likely to elicit sustain talk (p= <.05). Complex reflections and open questions were significantly less likely to elicit neutral client talk (p= <.01), whilst closed questions and MIIN behaviours were significantly more likely to elicit client neutral talk (p= <.01). MICO behaviours were significantly more likely to elicit neutral client utterances (p= <.05).

	Subsequent client utterance at lag two				
Initial Clinician Utterance	WCOM	SCOM	PREP	SUST	NEUTRAL
SREF	.05	.02	.40	.16	.36
CREF	.03	.04**	.43	.14	.35
OQ	.03	.03	.44	.20	.30††
CQ	.05	.03	.37	.13	.42
MICO	.01†	.00†	.31††	.13	.54**
MIIN	.07	.01	.24††	.21	.46

Table 14: Transition matrix for lag two interactions, showing the transitional probabilities between each clinician and client utterance category.

*Note: The transitional probabilities shown in Table 14 indicate the probability that if a specific clinician (row) utterance occurs, the second client utterance following it (column) will be in that client utterance category. For example, given that a clinician provided a simple reflection (represented by the acronym SREF in the first row), the first column along (WCOM) gives the transitional probability that the second client utterance occurring after it will be a weak commitment (represented by the acronym WCOM). Equal to, or more probable than expected by chance at the 0.05 level- *; equal to, or more probable than expected by chance at the 0.01 level- **. Equal to, or less probable than expected by chance at the 0.05 level- †; equal to, or less probable than expected by chance at the 0.01 level- ††.*

At lag two, complex reflections were significantly more likely than expected by chance to elicit strong commitment talk from clients (p= <.01). MICO behaviours in contrast were significantly less likely than expected by chance to elicit weak commitment utterances (p= <.05) and strong commitment utterances (p= <.05) from clients.

MICO behaviours were significantly less likely than expected by chance to elicit client preparatory talk utterances (p= <.01). MIIN behaviours were also significantly less likely than expected by chance to elicit client preparatory talk utterances (p= <.01). MICO behaviours were also significantly more likely than expected by chance to elicit neutral client utterances (p= <.01), whilst open questions were significantly less likely than expected by chance to elicit neutral utterances (p= <.01).

In contrasting the pattern of results between lag one and lag two sequences, it is apparent that there is some overlap in the spread of significant transition probabilities. MIIN behaviours are consistently less likely to evoke preparatory talk than would be expected by chance, across lag one and lag two. In addition, the effects of open questions and MICO behaviours in evoking client neutral utterances are consistent across lag one and lag two; albeit, there were some differences in the significance levels resulting from MICO behaviours.

Regression Analysis

To investigate whether specific clinician utterances were predictive of strong client commitment utterances, a linear regression analysis was conducted using SPSS 21.0. The clinician utterance categories of MICO, open questions, closed questions, simple reflections and complex reflections were regressed onto the client utterances category of strong commitment. Data were pooled across the sample, with analyses being conducted to examine the assumptions of linearity, homoscedasticity and normality within the data.

The data demonstrated a normal distribution of the residuals, as evidenced by the histogram in Appendix D. Linearity was assessed using a probability-probability (P-P) plot of expected and observed values (see Appendix E), with probability distributions demonstrating a linear pattern. Homoscedasticity was examined by plotting standardised residuals against standardised predicted values (see Appendix F). This plot indicated a broadly consistent relationship between the standardised residuals and standardised predicted values (Field, 2005).

The regression analysis demonstrated that the model was a significant predictor of strong commitment utterances (Strong Commitment adjusted R^2= .51, F (5, 14) = 4.91, p= <.01). Clinicians' complex reflections were a significant predictor of clients' strong commitment utterances (β = .75, t (16) = 3.42, *p*= <.01). No other categories of clinician behaviour were significant predictors of strong commitment utterances, as demonstrated in table 15.

Variable	B	SE B	95% CI	β	t
MICO	-.10	.05	-.21, .00	-.41	-2.11
SREF	-.09	.15	-.42, .23	-.16	-.61
CREF	.32	.10	.12, .53	.75	3.42**
CQ	-.14	.13	-.42, .13	-.22	-1.12
OQ	.18	.10	-.04, .40	.36	1.73

Table 15: Linear regression of the frequency of MICO behaviour, simple reflections, complex reflections, closed questions and open questions on to client strong commitment utterances

*Note: Strong Commitment Adjusted R^2=.51, F (5, 14), p<0.01. MICO- Motivational Interviewing Consistent Behaviours; SREF- Simple Reflections; CREF- Complex Reflections; CQ- Closed Questions; OQ- Open Questions. Statistically significant at the 0.01 level- **.*

Further Analyses

The second hypothesis of this study concerned the relationship between open questions and preparatory talk. However, given the results of the sequential analyses, it was decided that, in addition, an analysis of the role of complex reflections in eliciting preparatory talk was warranted. As identified in the literature, preparatory talk has been found to significantly predict the strength of client's commitment talk (Amrhein, Miller, Yahne et al, 2003), with other studies providing additional support for this finding (see Hodgins, Ching & McEwen, 2009). Therefore, it is important to distinguish behaviours which evoke preparatory talk, from those that do not.

In addition, previous studies highlight that particular clinician strategies may be beneficial for clients who are ambivalent about change, with such strategies focusing on evoking preparatory talk (Miller & Rose, 2013). As stated previously, it is reasonable to suggest that open questions may represent one such strategy. Therefore, it could be that open questions represent a means by which clinicians can prepare

ambivalent clients for change, whilst complex reflections are a means of increasing clients' commitment to change. The results of the previous sequential analyses revealed that open questions and complex reflections were more likely than expected by chance to elicit preparatory talk from clients.

It was believed that an additional analysis would help to establish whether open questions and complex reflections could potentially act as significant predictors of preparatory talk. More specifically, such an analysis could reveal whether complex reflections in this study, acted as a technique which was effective in evoking both preparatory and commitment talk, or whether complex reflections and open questions were akin to the 'decisional balance' and 'evoking' techniques described by Miller & Rose (2013).

To this end a linear regression analysis was conducted, regressing the clinician utterance categories of open questions and complex reflections onto the client utterance category of preparatory talk. Data were pooled across the sample, with analyses being conducted to examine the assumptions to linearity, homoscedasticity and normality within the data. The data demonstrated a normal distribution of the residuals, as evidenced by the histogram in Appendix G. Linearity was assessed using a P-P plot of expected and observed values (see Appendix H), with probability distributions demonstrating a linear pattern. Homoscedasticity was examined by plotting standardised residuals against standardised predicted values (see Appendix I). This plot indicated homogeneity of variance across the residuals (Field, 2005).

These analyses demonstrated that the model was a significant predictor of client's preparatory utterances (Preparatory adjusted R^2= .29, F (2,17) = 4.94, p= <.05). Clinicians' complex reflections were a significant predictor of clients' preparatory utterances (β = .58, t(17) = 3.02, *p*= <.01). Clinicians' open questions were not a significant predictor of clients' preparatory utterances, (β = .12, t(17) = 0.64, *p* = n.s.). These results are outlined in greater detail in table 16.

Variable	B	SE B	95% CI	β	t
CREF	.91	.30	.28, 1.56	.58	3.02**
OQ	.22	.35	-.52, .97	.12	.64

Table 16: Linear regression of the frequency of complex reflections and open questions on to client preparatory utterances.

*Note: Preparatory Adjusted R^2= .29, p= <.05. CREF- Complex Reflections; OQ- Open Questions. Statistically significant at the 0.01 level- **.*

Discussion

In this section, I will summarise the findings of this study within the context of the motivational interviewing and wider literature. I will then discuss the implications of the findings for the research and clinical practice of motivational interviewing and other psychological therapies. I will discuss the strengths and limitations of this study, and how such issues may influence the interpretation of the results. Lastly, I will discuss possible areas for future research, given the findings of this study and its limitations, and provide a summary with conclusions.

Research context of this study

This study was a secondary quantitative analysis of UKATT recordings and process data. These data were originally collected as part of the UKATT study, a multi-site study which sought to compare the effectiveness of MET with social behaviour and network therapy (UKATT Research Team, 2001). Various forms of process data were collected from UKATT, including scores on the RCQ (see Appendix A); an established measure which seeks to assess client's readiness to change, assigning them to one of three groups. These groups are pre-contemplation, contemplation and action, concepts originally outlined by Prochaska and DiClemente (1984) in their trans-theoretical model of change. Previous studies highlight that the more a client speaks about preparing to change, and the more they strongly commit to making a change, the more likely they are to actually change their behaviour (Amrhein, Miller, Yahne et al, 2003; Martin, Christopher, Houck et al, 2011). However, there is some inconsistency concerning which types of client utterance result in positive behaviour change. A fairly consistent finding is that 'strong' commitments are more likely to lead to change than other types of client utterances (for example, see Hodgins, Ching & McEwen, 2009; Gaume, Bertholet, Faouzi et al, 2013).

Previous studies have tried to investigate what clinicians do to evoke specific types of client utterance. The most common method in MI and across the psychotherapy literature has been to look at the statistical associations between frequency counts of behaviours of interest. However, some studies in the area of MI have investigated the sequences which are occurring within sessions, focusing on

what clinicians did immediately prior to client utterances of interest. These studies have tended to collapse categories of clinician talk; a process which tends to result in broad categories such as MICO and MIIN behaviours (see Moyers & Martin, 2006; Gaume, Gmel, Faouzi et al; Moyers, Martin, Houck et al, 2009). Findings have shown that, whilst MICO behaviours tend to be linked with change talk and positive behaviour change, they can also sometimes be linked to sustain talk. Such broad categories, whilst helpful in testing the assumptions of MI, provide only limited information for clinicians about what specific practices may help clients' prepare for, and commitment to change.

Studies by Miller and Rose (2013) and Tollison, Lee, Neighbors et al 2008) provide some insight into how specific categories of clinician utterance may be associated with clients' contemplation of, and commitment to change. However, studies which have examined the role of specific clinician behaviours in promoting change talk are few in number. Furthermore, none at the time of this study had been conducted to investigate the role of specific clinician behaviours in evoking preparatory talk and strong commitment to change from clients. As such, the purpose of this study was to investigate whether specific categories of clinician utterance were predictive of clients' preparatory talk and strong commitment talk. The hypotheses arising from a review of the literature were that open questions would be associated with, and predictive of preparatory talk, whilst complex reflections would be associated with, and predictive of strong commitment talk.

Discussion of the research aim and hypotheses in light of the MI and wider literature

How are commitment utterances evoked by clinicians?

The results obtained confirmed the first hypothesis of this study. They demonstrated that the clinician utterance category of complex reflections, as defined within the MI-SCOPE (Martin, Moyers, Houck et al, 2005), was significantly associated with, and predictive of strong commitment utterances. Complex reflections were significantly associated with strong commitment utterances which occurred at lag two. Complex reflections by the clinician also acted as a significant predictor of clients' strong

commitment talk, as demonstrated by regression analysis. No other category of clinician utterances demonstrated a significant association with strong commitment utterances, at either lag one or lag two. In addition, no other category of clinician utterances acted as a significant predictor of clients' strong commitment talk in the regression analysis. Interestingly, MICO behaviours (comprised of affirm, emphasise control, general information, permission seeking, raise concern, support and feedback) were actually significantly less likely than chance to evoke both weak commitment and strong commitment from clients at lag two.

The findings in this study concerning complex reflections are interesting when viewed alongside the evidence base. In previous studies, complex reflections were often grouped under the category of MICO behaviours, with client commitments being considered a type of change talk (for example, see Catley, Harris, Mayo et al, 2006; Gaume, Gmel, Faouzi et al, 2008; Moyers & Martin, 2006; Vader, Walters, Prabhu et al, 2010). In all of these studies, it was demonstrated that clinicians' use of MICO behaviours was associated with the occurrence of change talk. As such, given the fact that complex reflections are considered a sub-category of MICO behaviour, and that commitment utterances are considered a sub-category of change talk, the results of this study can be viewed as consistent with the results of these previous studies. However, given how general the category of MICO has been in these studies, and the fact that these studies did not separate out commitment from change talk and code its strength for analysis, it is difficult to draw comparisons.

A study which did use a similar method to this study was that of Moyers, Martin, Houck et al (2009). In their study, Moyers et al completed a sequential analysis and subdivided the traditional category of MICO behaviours, coding and analysing reflections and questions as separate categories. Moyers et al found that the association between MICO behaviours and client change talk was weak, relative to the association between clinicians' reflections and change talk. They summarised these findings as indicating that a clinician's skilled use of reflective listening may be more useful in evoking change talk than those behaviours which were categorised as MICO in their study (for example, supporting autonomy and affirming). The findings of the current study are consistent with those of Moyers et al in that complex reflections were shown to be significantly more effective than chance, in eliciting commitment talk. Moreover, the findings of this study are also somewhat consistent with those of Tollison, Lee, Neighbors et al (2008), who demonstrated that complex reflections can mitigate the negative impact of simple reflections on drinking

behaviour. However, in this study clinicians' complex reflections failed to significantly predict changes in client's drinking behaviour. This may be due to the fact that 'peer facilitators' (i.e. undergraduate and graduate students who were trained in the practice of MI for the study) delivered the intervention, as opposed to experienced, highly trained clinicians who could deliver complex reflections more skilfully. Whilst the current study did not analyse drinking behaviour directly, it can be said that the results of this study indicate that complex reflections do significantly predict strong commitment utterances; a type of utterance which has significantly predicted client drinking behaviour in other studies.

The results of this study also build on those of Moyers, Martin, Houck et al (2009), in that this study subdivided reflections into simple and complex, and subdivided change talk so that strong commitment was investigated as a stand alone category. It is shown here that complex reflections are significantly associated with, and significantly predict the occurrence of strong commitment talk. This is a key finding, as strong commitment has been shown to be most predictive of positive behaviour changes in clients, not only in MI, but also in CBT focused on substance misuse (see Aharonovich, Amrhein, Bisagam et al, 2008; Amrhein, Miller, Yahne et al, 2003). Whilst it is not possible to say that complex reflections were the definitive causal factor in evoking strong commitments from clients, the use of sequential data does strengthen the argument for causality. The fact that a significant association was observed in sequential data between complex reflections and strong commitment utterances indicates that these two categories of talk co-occur in sequence significantly more than would be expected by chance at the .01 level. Combined with the finding that complex reflections also acted as a significant predictor of strong commitment talk, one could state that there is a strong argument for causality between complex reflections and strong commitment talk.

It is interesting that this significant association was only demonstrated at lag two. The reasons for this finding are not entirely clear. The previous reports of Moyers et al indicate that instances of change talk often occur alongside other categories of talk, including sustain talk, in what has been termed a "change talk sandwich" (Moyers, Martin, Houck et al, 2009, pg. 1121). However, complex reflections in this study were significantly less likely to evoke sustain talk from clients at lag one. As such, though it is not possible to discuss any associations between strong commitments and sustain utterances in this study (as such an analysis was not conducted), it is unlikely that complex reflections would consistently elicit both

sustain and strong commitment talk together. This conclusion is based on the fact that sustain talk occurred significantly less at lag one following a complex reflection, but strong commitment occurred significantly more at lag two following a complex reflection. Alternatively, it is proposed here that the effect of complex reflections may be a delayed one, in that clients may not immediately respond to well-timed complex reflections with commitment. Indeed, this finding highlights the need for future studies to not only focus upon the immediate effects of clinician's comments, but to also study their effect later on in the interaction. This could prevent potentially useful strategies employed by skilful clinicians being wrongly highlighted as ineffective in future.

An informative finding is that MICO behaviours were actually associated with significantly less strong commitments from clients at lag two. This finding is contradictory to those previously highlighted in the literature. Previous studies have tended to find that MICO behaviours have a significant relationship with change talk (i.e. more MICO behaviours are associated with greater change talk; see Gaume, Gmel, Faouzi et al, 2008; Moyers & Martin, 2006; Vader, Walters, Prabhu et al, 2010). However, as stated previously, such studies often incorporated reflections and questions into the clinician utterance category of MICO. Therefore, it may be that the removal of such effective clinician behaviours from the MICO category in this study, substantially reduced the variance in strong commitment talk accounted for by the MICO category. The results of this study are consistent with such a conclusion, as MICO behaviours neither acted as a significant predictor of strong commitment, nor did strong commitment utterances occur significantly more than expected after MICO utterances. It may be useful to examine the remaining behaviours within the MICO category (namely affirm, emphasise control, feedback, general information, permission seeking, raise concern and support) individually in future research. This would help establish whether particular practices within the category of MICO behaviours are helpful in facilitating change, or have no significant positive impact on clients' commitment to change. Indeed, given the results of this study, it may be that some categories of clinician utterances in the MICO category are actually detrimental to clients' expressions of commitment and preparatory talk. On the other hand, it may be that particular categories have a positive impact on clients in a way which leads indirectly to commitment to change. For example, it is logical that categories of clinician talk such as affirm, support and emphasise control may act to increase clients' self-efficacy and confidence, which would likely lead to increased preparatory

talk in the form of 'ability' talk or 'taking-steps' (see Martin, Moyers, Houck et al, 2005). As specified previously, preparatory talk has been shown to predict the strength of commitment talk (see Amrhein, Miller, Yahne et al, 2003; Hodgins, Ching & McEwen, 2009). Therefore, it is advised that future research consider the impact of these individual categories not just on commitment talk, but also preparatory talk.

Though it is beyond the initial research aim of this study, it is worth mentioning that no category of clinician behaviour was significantly associated with the occurrence of more weak commitments at lag one or two. The only category which was significantly associated with weak commitments in any way was MICO behaviours, with this category evoking fewer weak commitments than would be expected by chance at lag two. On first impressions, this finding appears to further support the hypothesis that at least some MICO behaviours- as defined in this study- may be detrimental to clients' commitment to change. However, this hypothesis is founded on the belief that weak commitments are a good thing for clinicians to try to evoke, if they want clients to change their behaviour. At this point it is worth highlighting the possible meaning of weak commitments in MI sessions, as discussed in the literature. Gaume, Bertholet, Faouzi et al (2013) found that a greater amount of weaker commitment in their study predicted worse outcomes for clients, whilst strong commitments predicted better outcomes. They suggest that milder commitments may represent an attempt by the client to dilute their intention to change, whilst strong commitments represent a level of conviction which is distinct from that reflected by weak commitments. This suggestion is supported to an extent by previous evidence within the literature, highlighting that strong client commitments produce better outcomes than weak client commitments (Hodgins, Ching & McEwen, 2009). As such, it is possible that the reduction in weak commitment is not necessarily a bad thing. It is advised that further research is conducted into the extent which weak commitments predict positive behaviour change in clients, as it may be that clinicians need to be attentive to this category of utterances as they are to sustain utterances.

How were other types of client talk evoked?

The results of this study partially confirmed the second hypothesis, in that preparatory talk occurred significantly more than expected at lag one, after both complex reflections and open questions. The association between preparatory talk and these two clinician categories was investigated further with a linear regression analysis.

Complex reflections were demonstrated to be a significant predictor of preparatory talk, whilst open questions were not demonstrated to be a significant predictor. Therefore, the part of the second hypothesis that predicted open questions would also act as a significant predictor of preparatory talk was rejected. The finding that complex reflections acted as a significant predictor of preparatory talk was not expected.

Preparatory talk occurred significantly less than expected by chance at lags one and two, after MIIN behaviours. Preparatory talk also occurred significantly less than expected by chance at lag one after closed questions. Interestingly, MICO behaviours actually resulted in significantly less preparatory talk at lag two. In addition, complex reflections were also the only category of clinician utterances which had a significant relationship with sustain talk in any direction. Complex reflections resulted in significantly less sustain talk at lag one.

In considering these findings relative to the broader MI literature, it is apparent that those concerning complex reflections and open questions are broadly consistent with the existing literature. Many previous studies have integrated open questions and complex reflections into the general category of MICO behaviours (see Catley et al, 2006; Moyers & Martin, 2006; Vader, Walters, Prabhu et al, 2010). These studies have tended to investigate possible associations between MICO behaviour and change talk (a general category which tends to group commitment and preparatory talk- as defined in this study- together under one category). Such studies consistently demonstrate significant positive associations between MICO behaviours and change talk. What is interesting is that, unlike strong commitment talk, the association between preparatory talk, and complex reflections and open questions was observed at lag one. This may highlight the fact that clients are willing to demonstrate preparation for change immediately after complex reflections and open questions, whilst strong commitments are not made immediately.

It is intriguing that both complex reflections and open questions were associated with preparatory talk at lag one, with complex reflections also acting as a significant predictor of preparatory talk. Preparatory talk, as demonstrated by Amrhein, Miller, Yahne et al (2003) and Hodgins, Ching and McEwen (2009) may have an effect on client outcomes indirectly, as preparatory talk has been demonstrated to predict the strength of commitment talk. Indeed, a key role for clinicians in MI is the collaborative exploration of potential sources of dissonance, with the aim of amplifying the discrepancy between the client's current actions, and

important values and/or goals (Miller & Rollnick, 2002). The client then resolves the discomfort caused by this dissonance through positive behaviour change. The findings of this study suggest that it may be through the use of open questions and especially complex reflections, that clinicians can evoke preparatory talk, thereby increasing clients' dissonance. This is somewhat consistent with the suggestion of Miller & Rose (2013), who reported that clinicians should seek to evoke change talk with clients who are not yet ready to commit to change. In addition, complex reflections appeared to demonstrate a similar effect to that reported by Tollison, Lee, Neighbors et al (2008), who found that complex reflections mitigated the negative impact of simple reflections on clients' drinking behaviour. The fact that sustain talk occurred significantly less at lag one after complex reflections may indicate that the skilful use of such reflections by clinicians may actually serve a protective function. Specifically, they may play a preventative role against clients voicing support for the status quo. This is potentially helpful for clinicians to know, as sustain talk has been shown to be associated with poorer client outcomes (see Baer, Beadnell, Garrett et al, 2008).

Another interesting finding was that MICO behaviours were associated with less preparatory talk at lag two. As with strong commitment talk, it appears that when open questions and complex reflections are removed from the MICO category, the effectiveness of that category in terms of evoking preparatory talk is reduced. Given that preparatory talk is central to amplifying dissonance, and is associated with the strength of clients' commitments to change, this indicates that MICO behaviours may actually prevent clients engaging in a process which is important to change. This finding highlights a need to investigate this area more. It may be that particular sub-categories of client behaviour grouped under the MICO category are effective in evoking preparatory talk, but others are not. Research investigating whether certain behaviours play a significant role in evoking preparatory talk could have positive influence on the clinical practice of MI. In addition, the fact that this association occurred at lag two is evidence of the delayed impact some clinician utterances can have on a client's readiness to change. It would be beneficial for researchers and clinicians alike to consider this finding in designing future research, and in making clinical decisions during MI sessions.

The findings concerning the associations between MIIN behaviours and preparatory talk, and closed questions and preparatory talk, are again broadly consistent with those found in the literature. MIIN behaviours have previously been shown to be significantly associated with more sustain talk (Moyers & Martin, 2006),

less change talk (Gaume, Gmel, Faouzi et al, 2008), and worse outcomes (Apodaca & Longabaugh, 2008). The fact that preparatory talk was significantly less likely to occur after MIIN behaviours at lag one and lag two indicates how robust these negative associations are. It also demonstrates how MIIN behaviours can have both an instantaneous and delayed negative effect on client talk.

The finding that closed questions are associated with significantly less preparatory talk at lag one is consistent with the findings of Tollison, Lee, Neighbors et al (2008). Tollison, Lee, Neighbors et al reported that use of more closed questions was associated with less contemplation of change by clients after a motivational intervention. As noted previously, preparatory talk is theorised as being integral to the process of increasing dissonance, and it is this dissonance which increases readiness to change (Amrhein, Miller, Yahne et al, 2003; Heather, Honekopp & Smailes, 2009; Miller & Rollnick, 2013). As such, it appears that closed questions are negatively associated with a category of client talk which is thought to increase readiness to change.

Taken as a whole, these findings have interesting consequences for the clinical practice of MI, and for MI research. These consequences, and how they sit within current guidance on MI practice and recent research trends, are discussed in the next section.

How do these findings inform the clinical practice and research of MI?

The finding that complex reflections were significantly associated with, and significantly predicted strong commitment, indicates that this category of talk is potentially crucial to the effective practice of MI. As noted previously, strong commitments represent one of the most promising categories of client talk, as they have been shown to consistently predict positive client outcomes (Aharonovich, Amrhein, Bisagam et al, 2008; Amrhein, Miller, Yahne et al, 2003; Hodgins, Ching & McEwen, 2009). Though they were informally conducted, the observations of the author during the parsing and coding process highlight that complex reflections were often used after lengthy discussions about clients' ambivalence in sessions. Successful clinicians in UKATT seemed to frequently use complex reflections in the second half of their sessions, summarising any positive changes made by clients, along with both sides of the ambivalence. These complex reflections seemed to consistently bring the client to a point which may be characterised as a 'where does this leave you?'

moment. They frequently resulted in clients voicing their ability to change, and their strong commitment to change.

This kind of amalgamation of client's previous statements into a coherent whole is perhaps more accurately termed a 'summary', when considered in the context of the wider MI literature (Miller & Rollnick, 2013). This difference is important to note, given the lack of a specific code in the MI-SCOPE for clinicians' summaries. Indeed, a review of the definition for a complex reflection in the MI-SCOPE reveals that this category represents the closest fit to a summary as defined in the broader MI literature (see Martin, Moyers, Houck et al, 2005; Miller & Rollnick, 2013). This assertion is based on the emphasis within the MI-SCOPE on complex reflections being defined by their injection of meaning into a client's statements, and the capturing of both sides of the client's ambivalence. Regardless of the exact term used, it was apparent that clinician's use of complex reflections which coherently tied together both sides of the client's ambivalence- and any previous changes made- was integral to evoking strong commitment to change.

Interestingly, such strong commitment was demonstrated to have occurred after a small delay, at lag two. Logically this is not surprising, as it is unlikely that clients would commit to a potentially life changing action immediately after a complex reflection, without some consideration of what they have just heard. These findings indicate that when practising MI, clinicians should be sensitive to the delayed impact of their complex reflections on clients. Clinicians who are not attentive to the likely occurrence of strong commitment at lag two, may miss opportunities to reinforce commitment to change, and to use such commitment as an opportunity to explore behaviour change plans.

These findings also have wider ramifications for the practice of MI. Previously, the MI literature has heavily emphasised the need for clinicians to not consider MI as just a set of strategies or techniques (Miller & Rollnick, 2009). Instead, it is summarised as a complex style of communication which comprises a core 'spirit' (Miller & Rollnick, 2013) and specific skills which evoke an "intrinsic motivation to change" (Miller & Rollnick, 2009, pp. 131; Rollnick, Miller & Butler, 2008). This spirit is founded heavily in the Rogerian person-centred approach (Miller & Rollnick, 2009; Rogers, 1957). It is proposed to include acceptance (which comprises affirmation, autonomy support, unconditional positive regard and accurate empathy), compassion for the client's welfare, collaboration with the client, and evocation of arguments for change (Miller & Rollnick, 2013).

However, some previous studies have demonstrated that MI spirit may not entirely account for the behaviour changes observed following MI (see Apodaca & Longbaugh, 2009). In this study, many of the behaviours which would typically represent the spirit of MI- emphasising control, affirmations, support- were collapsed under the general category of MICO behaviours. This category was not positively associated with preparatory talk, weak commitment talk or strong commitment talk, either at lag one or lag two. In fact, MICO behaviours occurred significantly less than expected before all these categories at lag two. It is important to note at this point that the association between core conditions such as a collaborative therapeutic alliance and positive outcomes in psychotherapy, is one of the most robust findings in the history of psychotherapy research (Messer & Wampold, 2002). As such, it is not suggested here that the spirit of MI has a negative impact on outcome. No attempt was made in this study to define and code for MI spirit, as such it is not possible to say what impact it may have had upon the evocation of client commitment. However, given the previous findings and the lack of association between MICO behaviours and commitment, it is possible that clinicians need to skilfully employ both the spirit of MI and specific strategies such as complex reflections, in order for clients to commit to change. This is consistent with suggestions of Amrhein, Miller, Yahne et al (2003) and Amrhein (personal communication, 2013) who propose that clinicians may be most effective in facilitating change when they combine the more general aspects of MI (i.e. MI spirit) with specific strategies.

This conclusion is very relevant for clinicians. Providing a complex reflection which is consistent with the client's level of readiness, and the inherent meaning of the client's previous statements, is one of the most difficult skills MI clinicians must master. The risk of these reflections, as highlighted by Miller & Rollnick (2013), is that the clinician goes beyond what the client means, potentially resulting in the client distancing themselves from previous statements in favour of change. Martin, Christopher, Houck et al (2011) highlight an additional risk, pointing out that clinicians who offer reflections which go beyond the client's readiness to change will be ineffective, as the client will not commit to a change if they feel unable to carry it out. These conclusions are reinforced by findings of Amrhein, Miller, Yahne et al (2003) who reported that the strength of client's commitment was predicted by their preparatory talk. Further support is provided by the findings of Hodgins, Ching and McEwan (2009), and Martin, Christopher, Houck et al (2011), who both report associations between ability talk and commitment talk. Therefore, clinicians need to

be sensitive to the implied meaning of client's statements, and to their confidence in the prospect of change, if they are to offer a complex reflection which is accepted and evokes commitment to change.

The need for substantial skill amongst clinicians is also required when getting clients to the point where they can commit to change. Preparatory talk, as previously discussed, is theorised as being central to the process of increasing dissonance, as the clinician explores the client's arguments for change (Miller, 1983). It is when the client feels ready and able to change, that they are more likely to commit to it (see Amrhein, Miller, Yahne et al , 2003; Hodgins, Ching & McEwan, 2009; Martin et al, 2011). In this study, preparatory talk was significantly associated with both complex reflections and open questions. Open questions are, like complex reflections, a difficult skill to master. This is clearly highlighted by the number of errors one can make when attempting to ask one (see Miller & Rollnick, 2013). In addition, clinicians can run the risk of asking too many open questions, or of mistakenly asking closed questions inappropriately. The former mistake can be damaging to the client's level of engagement during an MI session. However, the latter has been associated in this study with significantly less preparatory talk than expected by chance. It is also associated with reduced contemplation of change by clients after MI sessions; especially when the balance between closed and open questions is more in favour of the former (Tollison, Lee, Neighbors et al, 2008). Therefore, there is a need for clinicians to be able to ask open questions skilfully during interactions in MI.

However, it appears that clinicians must also be mindful of when the strategies highlighted above (open questions and complex reflections) are most appropriate to use. Given that open questions are associated with more preparatory talk, it may be that these questions are an appropriate means of exploring and increasing client's dissonance. However, they may be of little use when trying to evoke strong commitment to change. On the other hand, complex reflections may be the strategy of choice to both increase dissonance, and elicit strong commitment to change when clients feel able to commit. Therefore, the clinician needs to assess the client's readiness to change, and tailor their strategies accordingly. This assertion is similar to that previously outlined by Miller & Rose (2013), who proposed that clinicians should seek to evoke preparatory talk from clients who are ambivalent, but refrain from such a strategy when the client is ready to commit.

These conclusions are also relevant for researchers. It is intriguing that previous studies which have investigated the efficacy of MI have often used

inexperienced clinicians to deliver the intervention. More specifically, previous studies have often used professionals who have no previous core training in psychological therapies (e.g. doctors and nurses), or lay people who are trained in the use of a motivational intervention as part of the study. If the skilled use of complex reflections, open questions and MI spirit is central to the effective use of MI, then these previous studies may have underestimated the effectiveness of MI through their choice of clinicians. As previously stated, open questions and complex reflections are difficult to get right. Therefore, clinicians may require more substantial experience and training in MI than that which is offered as part of typical studies, in order for the intervention to be used to its full potential. For example, the UKATT study sampled clinicians who had extensive experience and training in the use of MI, and it is from UKATT MET sessions that the findings discussed here were obtained. These conclusions are an indication of the need for services inside and outside of the NHS, to ensure that those clinicians delivering MI are experienced and sufficiently trained in it.

A further point which is relevant to researchers concerns the importance of investigating processes of change in MI and MET. As highlighted in the introduction, there is a dearth of understanding about the mechanisms responsible for the changes observed following psychological therapies, including MI and MET (see Garfield, 1990; Lambert, 2004). This study acts on the recommendations of Miller and Rose (2009) to investigate the processes involved in changing client's behaviour during motivational interventions. In doing so, it has provided a valuable insight for researchers and clinicians alike about what skills and processes may be important to focus on when attempting to understand and facilitate change. Moreover, the current study reinforces the suggestion of Elliot (2010), in that change process research is a valuable addition to the randomised control trials which have established the effectiveness of MI and MET (see Lundahl & Burke, 2009; Lundahl, Moleni, Burke et al, 2013). Therefore, this study highlights the importance of investigating processes of change, in addition to the more frequent investigations of the effectiveness of psychological therapies.

In addition, the current study has provided further support for the importance of investigating the common factors which make psychological therapies effective. It revealed that the skilful use of complex reflections and open questions was central to eliciting the preparatory and strong commitment utterances which have been associated with, and predictive of positive client outcomes in other studies (see table

2). Importantly, these types of client talk have been highlighted as a crucial component of the effectiveness of several psychological therapies in addressing problematic behaviours, including CBT (see Aharonovich, Amrhein, Bisagam et al, 2008). Therefore, it may be that clinicians' skilful use of the strategies that elicit these categories of client talk are important to the effectiveness of many psychological therapies, including MI, MET and CBT. This is consistent with the suggestions of Messer and Wampold (2002), who highlight the equivalent effectiveness of psychological therapies as evidence of the need to focus on common factors, such as clinicians' skill in delivering therapy, when investigating change processes.

How do these findings inform the practice of other psychological therapies?

Some of the findings from this study apply to other types of psychological therapy. As outlined previously, complex reflections-as defined in the MI-SCOPE (Martin, Moyers, Houck et al, 2005)- may be best thought of as summaries when viewed in the context of the MI literature (Miller & Rollnick, 2013). The ability to provide accurate summaries of themes that emerge in therapy sessions is a key skill in the practice of CBT (Beck, 2005; Cully & Teten, 2008). These summaries help clients to increase their awareness of emotional experiences in session, understand the content of sessions and highlight possible difficulties which require attention. Summaries are a powerful skill, and their use substantially influences therapeutic outcomes. However, summaries are also a difficult skill to learn, and those with less experience in the delivery of psychological therapy may struggle to accurately identify themes for summaries in a way which positively impacts on treatment outcomes (Cully & Teten, 2008). Similarly, open questions are crucial in the skilful use of Socratic questioning, and are central to collaboratively establishing and exploring the difficulties clients hope to address.

It is likely that these skills are just as relevant for other psychological therapies- as well as CBT and MI- given that collaboratively established formulations are central to many evidence-based psychological therapies (BPS, 2011). Indeed, by their very definition, collaborative formulations are established with the client; it would be difficult to accurately integrate the client's perspective into the formulation, without the use of open questions and summaries to elicit and clarify the client's perspective. Therefore, it would be interesting to explore in future, whether complex

reflections and open questions have an impact on variables of interest in other psychological therapies.

In addition, the finding that complex reflections and strong commitment talk were associated at lag two has interesting ramifications for other psychological therapies. CBT states that information which is discrepant with one's beliefs about the world, self or others may not be consciously attended to, or processed for storage in memory (Beck, 2005; Fennell, 2009). This bias in attention and processing poses some difficulties for clients, as it proposes that information which is consistent with negative beliefs is attended to, processed and stored into memory much more readily than information that isn't. This results in the reinforcement of client's negative beliefs, and difficulty establishing more positive ones.

This has some similarities with the concept of dissonance in MI. Clinicians practising MI are advised to increase client's awareness of the dissonance between their beliefs and their behaviour (Miller & Rollnick, 2013). The MI clinician uses this dissonance, amplifying it to trigger change. Therefore, the clinician is making the client aware of information which is not consistent with their values and beliefs about themselves. Such dissonance is often presented to the client in the form of complex reflections. It is intriguing that the impact of such complex reflections is delayed, in that information which is often discrepant with the client's beliefs has a delayed impact on strong commitment to change. It may be that clients require some additional time to process this information, in a way that its discrepancy with their current beliefs and values is considered and understood. It would be interesting for future studies to investigate whether the provision of information discrepant with clients' negative beliefs has a delayed effect in other psychological therapies. It could be that valuable opportunities to increase a client's understanding and make positive changes to negative beliefs arise after a brief delay.

Strengths and limitations of the current study

Study Design

Bakeman & Gottman (1997) highlight how, surprisingly, researchers who have been interested in the processes occurring within therapy have tended not to use methods which focus on sequences in interactions as they unfold over time. Instead, studies

have often used more static measures of clinician and client behaviour, which miss the intricate, dynamic nature of therapeutic interactions. This tendency is demonstrated by the use of predominantly correlational methods in research, not only in MI, but the wider psychotherapy literature (Garfield, 1990). The result of this has been that little information has been uncovered regarding the causal mechanisms that lead to good outcomes. This study combines the use of sequential analysis with regression analysis. The use of sequential data at lag one and two, allows one to establish which categories of utterance precede those that are linked to positive outcomes. Such sequential data are complemented by the use of linear regression, as researchers can examine which clinician utterances predict those client utterances linked to good outcomes. Therefore, whilst it cannot be definitively stated that complex reflections cause strong commitment talk, the combined use of sequential and regression analyses strongly implies that complex reflections cause strong commitment talk.

In addition to this, this study also built on similar studies in that it also analysed the significance of lag two transitional probabilities. Moyers, Martin, Houck et al (2009) highlight how sustain and change talk can co-occur, such that clients may explore both sides of their ambivalence in the same response. This co-occurrence of opposite sides of the client's ambivalence may happen even when the clinician is practising MI proficiently. Therefore, the risk of studying interactions by only focusing on lag one sequences is that researchers may mistakenly conclude that a clinician utterance is ineffective on the basis of what came immediately after it. By studying the immediate and more delayed impact of clinician utterances on the client, this study was able to demonstrate that complex reflections have a significant, but delayed impact on clients' strong commitment talk.

This study also integrated a number of recent developments from the MI literature. As previously highlighted (see Aharonovich, Amrhein, Bisagam et al, 2008; Amrhein, Miller, Yahne et al, 2003; Hodgins, Ching & McEwen, 2009) it is crucial when investigating which clinical practices are effective in MI, to consider which client utterances lead to the best outcomes. Previous research has shown that clinicians should not just rely on evoking broad categories of client utterances, such as change talk, if they wish to facilitate change. Whilst the previous literature has shown an inconsistent relationship between subcategories of preparatory talk and positive outcomes (for example, reasons, need and ability to change), strong commitments have shown a much more consistent relationship with positive outcomes (see table 2). As such, it is important to consider individual categories of client utterances, such as

commitment, and to also focus on the strength of these utterances. This study integrated those developments in the literature into the research design, and investigated which categories of clinician utterances were associated with, and predicted strong commitment from clients. Therefore, the findings may go some way to providing more specific information to clinicians, regarding what practices they should consider in trying to facilitate change.

In addition to investigating specific categories of client utterances, this study also considered specific categories of clinician utterances. Previous research investigating sequences in MI has tended to group together clinician behaviours under broad categories (see Catley, Harris, Mayo et al, 2006; Gaume, Gmel, Faouzi et al, 2008; Vader, Walters, Prabhu et al, 2010), with only a minority investigating specific clinician behaviours (see Moyers, Martin, Houck et al, 2009; Tollison, Lee, Neighbors et al, 2008). These categories provide some useful information, in that they serve to test the assumptions of MI; specifically, that clinician behaviours which are intended to elicit change talk actually do so in practice. However, the investigation of these broad categories does not provide helpful guidance to clinicians using MI. For example, these studies could not inform a clinician about which specific techniques or skills may or may not be helpful in eliciting commitment to change. Authors have highlighted the need to focus on the specific skills clinicians use in therapy to produce good outcomes (see Lambert, 2004). This study subdivided the general category of MICO behaviours, investigating specific categories of clinician behaviour to see whether they precede and predict strong commitment talk. As such, this study has provided specific findings which are clinically useful to clinicians using MI.

An additional strength of this study was that inter-rater reliability was established prior to the parsing and coding of the session recordings. Specifically, the criteria were as such that HC and I had to demonstrate excellent inter-rater reliability over several recordings (Cicchetti, 1994). These stringent criteria reduced the subjectivity in the use of the MI-SCOPE. This was particularly important in this study, as the MI-SCOPE was adapted to investigate the research aim (see table 4). Therefore, one can say with greater certainty that the codes included within the altered MI-SCOPE were parsed and coded reliably. Moreover, the investigation of rater drift also ensured that parsing and coding was carried out reliably over time.

However, it is important to note that rater drift was not investigated toward the end of the parsing and coding process. As highlighted by Dallos (2006), when an individual uses an established coding framework they may alter their use of it as time

passes. In this study, rater drift represented a threat to the validity and reliability of the parsing and coding process. It is reasonable to assume that without the re-examination of rater drift at the start, middle and end of the parsing and coding process (in terms of how many recordings from the whole sample had been parsed and coded), a rater may begin to change their practices. Therefore, it cannot be said that the second half of recordings were parsed and coded reliably, given that the last analysis of rater drift in this study occurred when half of the recordings in the main sample had been parsed and coded.

Another critique of this study is that the analysis of transition probabilities for weak and strong commitments, at both lags one and two, did not meet the criteria set by Haberman (1979) for calculating accurate p-values. In essence, Haberman stated that the number of given events within each cell in a transition matrix must exceed 30. In addition, the ratio of the expected frequency of a cell relative to the actual frequency of the given event for that cell must be greater than .1 and less than .9. When these criteria are not met, the p-value for the adjusted residual (i.e. the z-score which represents a standardised version of the difference between the observed and expected frequencies) in that cell is less accurate. As such, the p values for transitional probabilities of weak and strong commitments should be interpreted with some caution.

Study Sample

The sample used in this study was taken from the UKATT database held at the Leeds Addiction Unit. The UKATT study was the largest alcohol treatment trial ever conducted in the United Kingdom, and sought to address the need for more multi-site trials investigating treatments for alcohol misuse (UKATT Research Team, 2001). As stated previously, due to the high percentage of individuals who declined to participate (42.1%), or were classed as ineligible to participate (23.7%) in the UKATT study, the sample of the UKATT study may not have been representative of the population it sought to investigate. Given that the current study drew its sample directly from the UKATT database, this issue also applied to this study.

However, examination of the exclusion criteria for the UKATT study indicates that clients were not excluded on the grounds of currently suffering with a complex

mental or physical illness, or due to other issues which would be likely be encountered in clinicians' day-to-day clinical practice. Indeed, many of the criteria dictated that clients only be excluded if they were unable to engage effectively in the UKATT study due to practical barriers (e.g. moving out of the area, illiteracy or being under the age of 16; UKATT Research Team, 2001). Additional criteria stated that participants should be excluded only if they had a severe cognitive impairment which impeded their ability to engage in, and benefit from treatment. Those with severe psychotic illness were not excluded if they were able to demonstrate that they could engage with, and benefit from treatment. Such exclusion criteria are not dissimilar to those that clinicians may use in everyday clinical practice. In the experience of the author and study supervisors, it would make little sense for a clinician to use a treatment with a client, when it is clear that the client will not benefit from it due to severe cognitive impairment or severe psychosis. To do so may invoke opportunity costs (i.e. the client engaging in an intervention which results in no benefit, when they could have received an alternative treatment from which they may have benefitted), which could be damaging the client (Lilienfeld, 2002). Moreover, the UKATT study had a very large sample, and used exclusion criteria comparable with those of Project MATCH and other major trials at the time (UKATT Research Team, 2001). Therefore, as previously stated the sample used in this study was likely no less representative of the population of interest than some of the highest quality studies in the field of alcohol misuse.

A strength of the sample used in this study concerns the use of participants who demonstrated positive change on the readiness to change questionnaire (Heather & Honekopp, 2008). Previous studies in MI have often measured the success of an intervention according to whether it resulted in changes to the client's behaviour (see table 2). This tendency to focus on behaviour change as the primary outcome variable negates the fact that MI is also concerned with increasing client's readiness to change (Miller & Rollnick, 2013). As stated previously a client would demonstrate positive change if they began to contemplate change, when before they had not done so. Therefore, in studies investigating processes in MI it is important to also focus on client's who demonstrated increases in readiness to change, and to discover what clinician's may have done to facilitate that change. This study examines such a group of participants, and therefore offers a unique insight into the strategies clinicians used in sessions where afterward, the client reported increased readiness to change. These

important strategies may not have been detected if the sample had only included people who changed their drinking behaviour, or if a random sample was used.

A critique of this study concerns the size of the sample used. Due to the limited time and number of individuals available to parse and code selected recordings, the sample in this study was reduced from a possible 32 to 20. Obviously, the sample size was limited by the use of stringent inclusion criteria regarding forward movement in stage of change, and by the exclusion of recordings which demonstrated poor audio quality. This led to difficulties during the sequential analysis, as low expected frequencies in some of the cells at lags one and two made the analysis of some types of transitions impossible without violating assumptions (see Wickens, 1982; 1989 Bakeman & Gottman, 1997). As such, whilst this study did analyse the transition probabilities of specific categories of questions and reflections, it was not possible to do the same for specific categories grouped under MICO behaviours.

However, an additional critique of this study concerns the actual joint frequencies of observed events in the transition matrices; both at lag one and lag two. As described previously, Bakeman and Gottman (1997) suggest that when the actual number of observed events in a cell is less than 5, the z-score, and therefore the p-value calculated for that cell is negatively affected. That is, the power of the analysis of that cell is reduced. On review of the data in Appendix C, it is apparent that the actual observed frequencies of events in some cells at lag 1 and lag 2 are below 5. Specifically, a total of 6 cells across both lag 1 and lag 2, all of which describe transitions between clinician behaviours and client weak and strong commitments, fail to meet the criteria of Bakeman and Gottman (1997). Therefore, when drawing conclusions about the significance (or not) of transitions between these categories of clinician and client utterances, one must draw such conclusions carefully given that such analyses were underpowered.

A further important consideration concerns the power of the linear regression analyses conducted in the current study. As described previously, there are various recommendations in the literature detailing how researchers can ensure adequate power when conducting regression analyses. To broadly summarise these suggestions, Harris (1985) recommends that when conducting a regression analysis with five or fewer predictors, the sample size should exceed the number of predictors by at least 50. However when small effect sizes are expected, to ensure these are detected VanVoorhis and Morgan (2007) suggest that a regression analysis should be conducted with 30 participants per predictor. Unfortunately, the current study was

conducted using restricted resources (both in terms of time and financial resources) and had a restricted sample size due to stringent sampling criteria and the loss of recordings (see Figure 3). In light of the criteria outlined by Harris (1985) and by VanVoorhis and Morgan (2007), it is apparent that the regression analyses in the current study were underpowered. The implications of this are that any small effect sizes for the relationships between the clinician and client utterance categories of interest may not have been detected. Previous studies in this area (see Moyers, Martin, Houck et al, 2009; Vader, Walters, Prabhu et al, 2010) have found small effect sizes for the effect of clinician MICO behaviour on client change talk. It is difficult to generalise relationships amongst these broader categories of client and clinician talk in the literature to the more specific categories in the current study. Nonetheless, it is possible that clinician utterance categories with small effect sizes in the current study could have acted as significant predictors of client utterance categories of interest (i.e. strong commitment and preparatory talk). This is in addition to the significant relationships found between complex reflections and strong commitment, and complex reflections and preparatory talk. However, due to the underpowered nature of the regression analyses, these significant relationships may not have been detected.

Considerations for future research

The findings from this study have important ramifications for future research. Firstly, this study sampled clients who had achieved and maintained forward movement in their stage of change across all follow-up points (from before the intervention, to 3 months and 12 months post-intervention). As noted previously, MI is not just concerned with behaviour change, but also a client's readiness to change (Miller & Rollnick, 2013; Resnicow, Soet, Borrelli et al, 2002). Previous MI studies have tended to judge the success of the intervention on behavioural outcomes (see table 2). This potentially runs the risk of declaring an intervention as ineffective, due to its failure to significantly change behaviour. In fact, that same intervention may have resulted in important shifts in client's readiness to change. Future studies investigating the effectiveness of MI should therefore integrate measures of readiness to change into their outcomes of interest.

Another related consideration for future research is the fact that the findings of this study emerged from the investigation of successful sessions. Wampold (2001) highlights how deconstruction studies have shown that specific ingredients have little impact on psychological therapy outcomes. It is accepted wisdom that many of the factors influencing a client's outcomes originate from outside of the therapy room. Moreover, it is likely that other non-specific factors, such as the quality of the therapeutic alliance, have a substantial impact on MI outcomes. However, the findings of this study and previous studies (see Apodaca & Longabaugh, 2009), indicate that the 'spirit' of MI may need to be combined with the skilful use of specific behaviours in order to be effective. It appears that the search for specific ingredients leading to change, at least in MI, is not misguided. Indeed, effective clinicians are likely those who combine the spirit of MI, with the skilful use of complex reflections and open questions. Future studies should further investigate the role of specific strategies in MI. It may be that particular behaviours included in the MICO category in this study had their positive impact on commitment and/or preparatory talk diluted, due to being grouped in with other unhelpful behaviours, or behaviours that had no impact. For example, it is logical to assume that the clinician behaviours of emphasise control, support and affirm may have a positive impact on a client's self-efficacy. This would likely have an impact on ability talk- a subcategory of preparatory talk- which has been shown to predict the strength of a client's commitment to change (Amrhein, Miller, Yahne et al, 2003; Hodgins, Ching & McEwen, 2009). This future area of research could possibly factor in clinicians use of MI spirit, as it may be that MI spirit and specific strategies interact to facilitate positive client outcomes.

These findings also have additional consequences for the wider literature. As noted previously, it is possible that complex reflections and open questions may play a substantial role in other psychological therapies. For example, the use of complex reflections and open questions may facilitate the increased insight clients often gain during therapy. That is, the ability of clients to see the links between their thoughts, feelings and behaviours, thereby understanding the causes of their experience (see Appelbaum, 1973). If so, then this would highlight the need for clinicians practising other forms of psychological therapy to be experienced, appropriately trained and supervised. This would ensure the effectiveness of such psychological therapies would not be reduced by the unskilled used of key strategies- both in research trials and in day-to-day clinical practice. Therefore, future studies should investigate the possible roles these categories of clinician talk have in other psychological therapies.

Another relevant point for the wider literature concerns the choice of clinicians in MI studies. The findings of this study demonstrated that the most effective strategies for eliciting strong client commitment are also some of the most difficult to master. Given this, it is recommended that future studies ensure those administering MI as part of effectiveness studies are experienced clinicians, who are sufficiently trained and appropriately supervised. This will ensure that the effectiveness of the intervention is not confounded by clinicians' experience or competence. Moreover, in studies of therapy sequences, this will ensure that the potential to analyse the skilled use of specific utterances is not undermined by clinicians' competence or experience.

A related point concerns which specific categories of clinician behaviour researcher should focus on. This study is unique in that it investigated the role specific clinician behaviours have on clients' commitment to change. The more general category of MICO behaviours, once complex reflections and open questions were removed, was shown to not be associated with clients' strong commitment talk. Future studies should consider using this approach to investigate whether any of the specific clinician behaviours included within the MICO category in this study, are actually associated with strong commitment talk and/or outcomes. This would help to separate out the practices advocated within the MI literature that have an impact on commitment and outcomes, from those that don't. However, in order to examine these associations, it will be important to focus on the intricate interactions between clinicians and clients. Previous studies have relied too heavily on investigating correlations between the frequency counts of process variables (Lambert, 2004). These types of investigations have underplayed the impact of sequences and timing in therapy. As such, future studies should seek to use sequential methods of investigation, as they provide a richer insight into the second-by-second processes occurring in therapeutic interactions.

In particular, sequential analyses are useful in that they allow one to look at both the immediate, and delayed impact of clinicians' behaviour. This study found that complex reflections have a delayed impact on clients' strong commitments. No association occurred at lag one (i.e. the client utterance immediately following a clinician's utterance), but an association was observed at lag two (i.e. not the client utterance immediately following a clinician's utterance, but the client response after that (see figure 2 for more information)). Future studies should follow the example set here, and investigate the immediate and delayed impacts of specific clinician

utterances on client utterances. If not, important delayed responses to clinician behaviours may be missed.

In order to investigate these sequential patterns, larger sample sizes must be considered in future studies. In this study, categories of clinician utterances were collapsed under the general category of MICO. The reason for this was that expected frequencies in transition matrix cells which included these categories were too low. As noted previously, it is generally advised that expected frequencies equal to, or greater than 2-3 are obtained for the majority of cells in transition matrices (Wickens, 1982; Bakeman & Gottman, 1997). As such, in order to increase the chance that specific clinician behaviours in the MICO category can be separately investigated, larger sample sizes are advised.

Summary and Conclusions

The results of this study provide an important addition to the evidence base of MI, as well as informing the clinical practice of those using MI. Previous research has established the effectiveness of MI, however it has provided little insight into the processes which make MI effective. This study casts light on some of the factors which may make particular clinicians more effective than others, even when they are using the same intervention. Consideration of the evidence base, alongside discussions with leading researchers in the field of MI processes, informed the selection of specific categories of clinician behaviour which showed promise. These behaviours were complex reflections and open questions. The investigation of these categories- as they occurred in successful sessions- using sequential analysis and regression analyses provided new insights. Previous studies have too often relied on the use of broad categories of clinician and client behaviour, exploring possible associations between the frequencies counts of these behaviours. These results can be useful, but provide little information about the processes occurring in MI. Moreover, they do not provide much in the way of useful guidance for MI clinicians.

The results of this study revealed that some practices, as advocated by the MI literature, may not be as crucial as once thought. Indeed, when complex reflections and open questions were removed from the more general category of MICO (the use of which has dominated previous studies), such a general category was not associated with key categories of client talk. It may therefore be the case that other specific

categories of clinician behaviour included in this broad category are effective, whilst others are not. Future studies should focus upon determining which clinician behaviours hold the most promise, and what function they serve in getting clients prepared for, and/or committed to change. However, such studies should consider these behaviours necessary, but not sufficient to facilitate positive change. Given previous research demonstrating the role of non-specific factors in determining therapy outcomes (see Messer & Wampold, 2002; Wampold, 2001), it would be wise to consider how these specific behaviours combine with the proficient use of the spirit of MI. It may be that these two variables interact to produce positive client outcomes.

Through the use of a unique methodology, the current study found that complex reflections are a very effective skill clinicians can use to elicit strong commitment to change from clients. However, complex reflections are one of the most difficult skills for clinicians to master. Therefore, researchers and those commissioning health services should consider the value of ensuring clinicians are well-trained and experienced enough to use this skill proficiently. However, when working with clients who are not yet ready to commit to change, clinicians can use open questions and complex reflections to prepare clients for change. Indeed, open questions and complex reflections were shown to produce more preparatory talk immediately after clinicians asked them. On the other hand, the effect of complex reflections on strong commitment to change was delayed. This may indicate how clients process and consider information which highlights a substantial amount of dissonance between them, and their values and beliefs. Nonetheless, this finding is similar to that of Miller & Rose (2013), who proposed that clinicians should use different strategies depending on whether clients are ready to commit to change or not. Future studies should use sequential analysis to consider the role complex reflections and open questions have in other types of psychological therapies, as it may be that these skills serve crucial functions in therapies other than MI.

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Appendices

Appendix A- Readiness to change (treatment version) questionnaire

READINESS TO CHANGE
(TREATMENT VERSION) QUESTIONNAIRE
ITEMS* (Heather and Hönekopp, 2008)

1. It's a waste of time thinking about my drinking because I do not have a problem. (PC)

2. I enjoy my drinking but sometimes I drink too much. (C)

3. There is nothing seriously wrong with my drinking.
(PC)

4. Sometimes I think I should quit or cut down on my drinking. (C)

5. Anyone can talk about wanting to do something about their drinking, but I'm actually doing something about it. (A)

6. I am a fairly normal drinker. (PC)

7. My drinking is a problem sometimes. (C)

8. I am actually changing my drinking habits right now (either cutting down or quitting). (A)

9. I have started to carry out a plan to cut down or quit drinking. (A)

10. There is nothing I really need to change about my drinking. (PC)

11. Sometimes I wonder if my drinking is out of control. (C)

12. I am actively working on my drinking problem. (A)

*Stage assessed in brackets as follows: PC, Precontemplation; C, Contemplation; A, Action

Appendix B- Tables of expected frequencies for lag one and lag two

Lag 1 Expected Frequencies

	WCOM	**SCOM**	**PREP**	**SUST**	**NEUTRAL**
SREF	15.42	13.71	169.88	55.27	215.72
CREF	19.30	17.15	212.53	69.15	269.88
OQ	14.57	12.95	160.48	52.21	203.79
CQ	13.26	11.79	146.02	47.51	185.43
MIIN	2.76	2.45	30.36	9.88	38.55
MICO	6.70	5.95	73.73	23.99	93.63

Lag 2 Expected Frequencies

	WCOM	**SCOM**	**PREP**	**SUST**	**NEUTRAL**
SREF	12.05	8.41	122.96	49.09	122.50
CREF	14.57	10.17	148.72	59.38	148.17
OQ	9.60	6.70	97.97	39.12	97.61
CQ	5.81	4.06	59.33	23.69	59.11
MIIN	2.76	2.45	30.36	9.88	38.55
MICO	6.70	5.95	73.73	23.99	93.63

Appendix C- Tables of actual joint frequencies for lag one and lag two

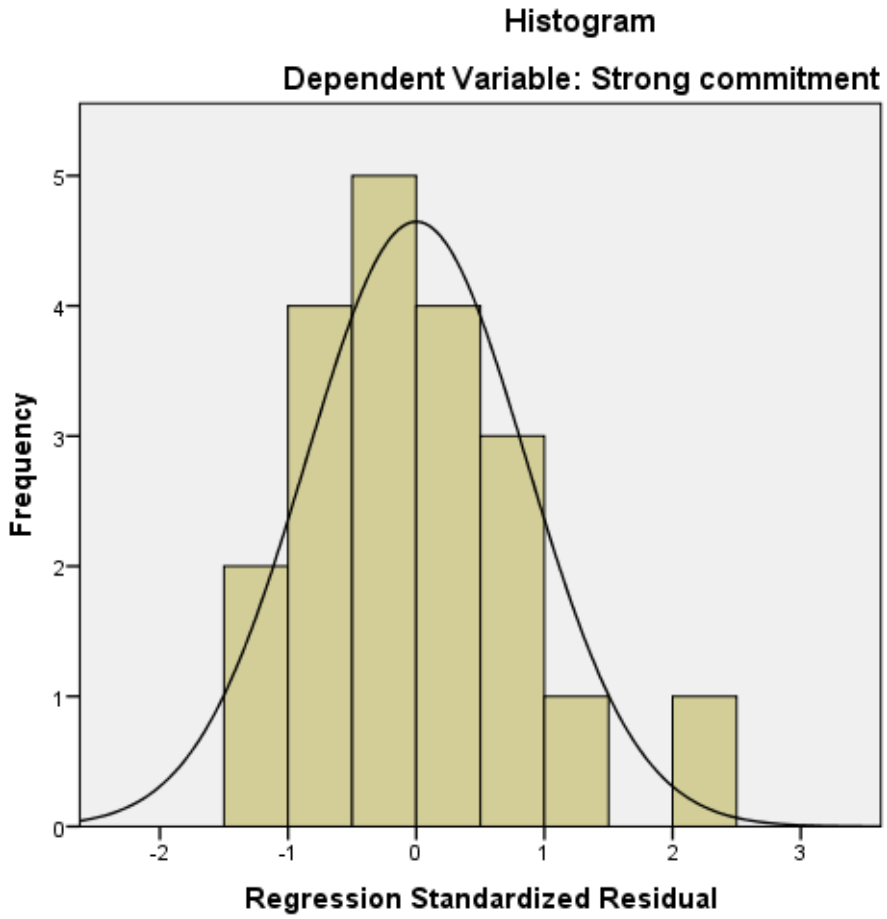
Lag 1 Actual Joint Frequencies

	WCOM	**SCOM**	**PREP**	**SUST**	**NEUTRAL**
SREF	14	9	154	66	227
CREF	22	22	245	56	243
OQ	19	14	225	61	125
CQ	9	7	90	44	254
MIIN	3	2	15	13	51
MICO	5	10	64	18	107

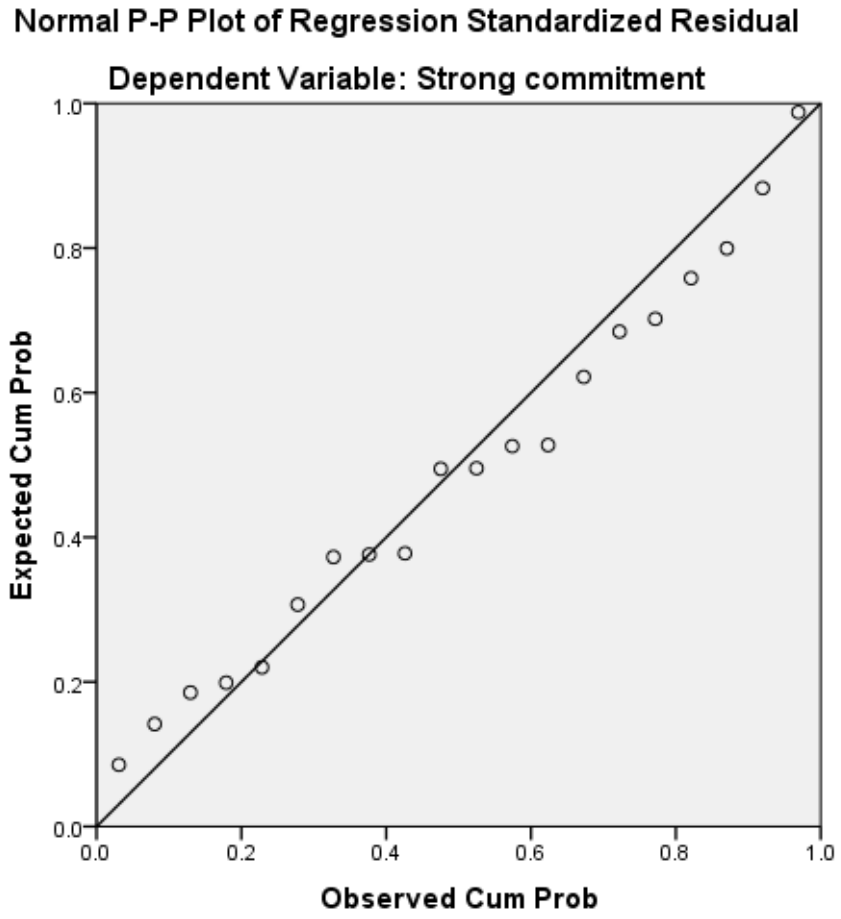
Lag 2 Actual Joint Frequencies

	WCOM	**SCOM**	**PREP**	**SUST**	**NEUTRAL**
SREF	17	7	126	51	114
CREF	12	17	163	54	135
OQ	8	7	111	49	76
CQ	8	4	56	20	64
MIIN	5	1	17	15	33
MICO	3	1	68	27	117

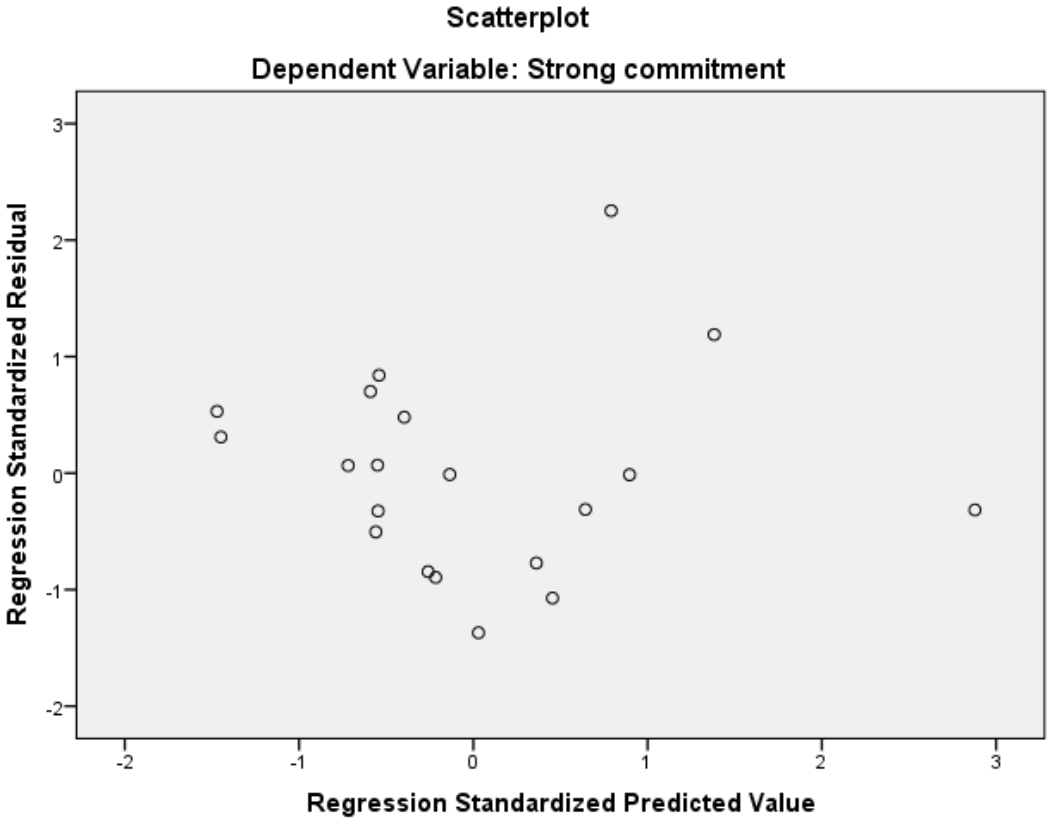
Appendix D- Histogram illustrating the distribution of the residuals (strong commitment regression analysis)



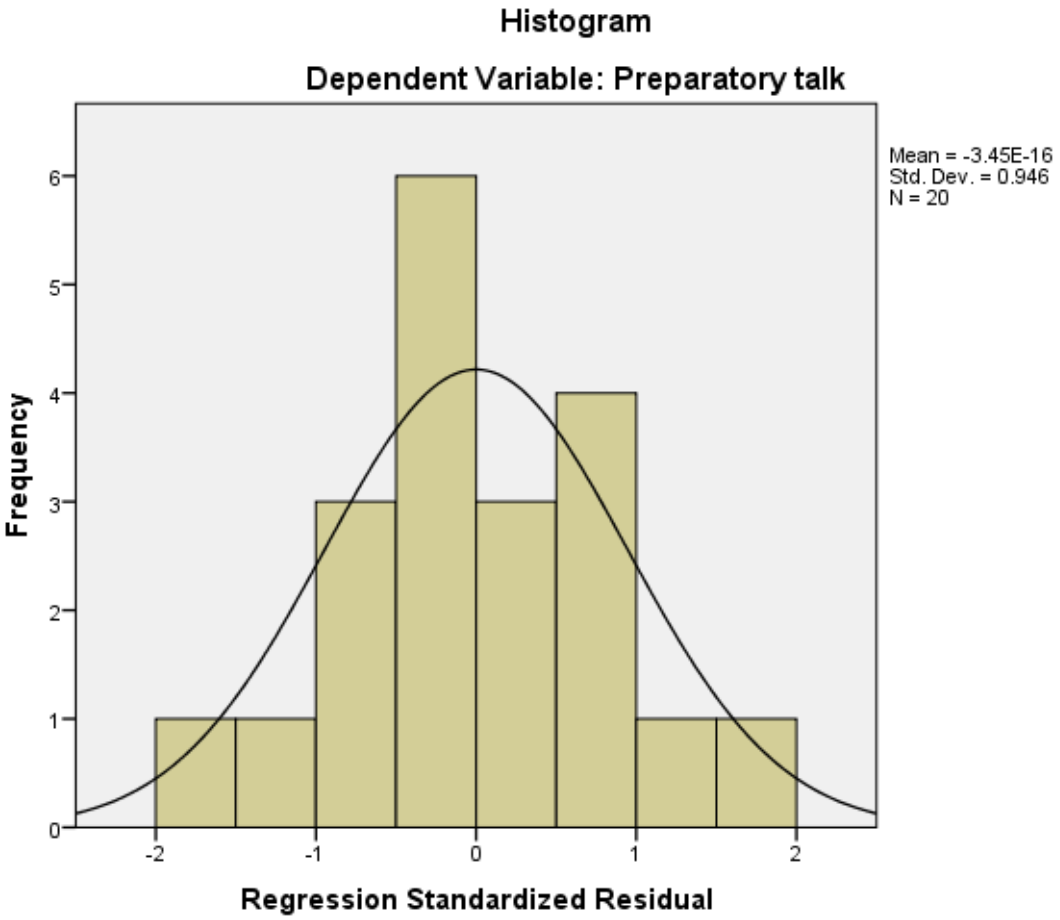
Appendix E- Probability-probability (P-P) plot of expected and observed values (strong commitment regression analysis)



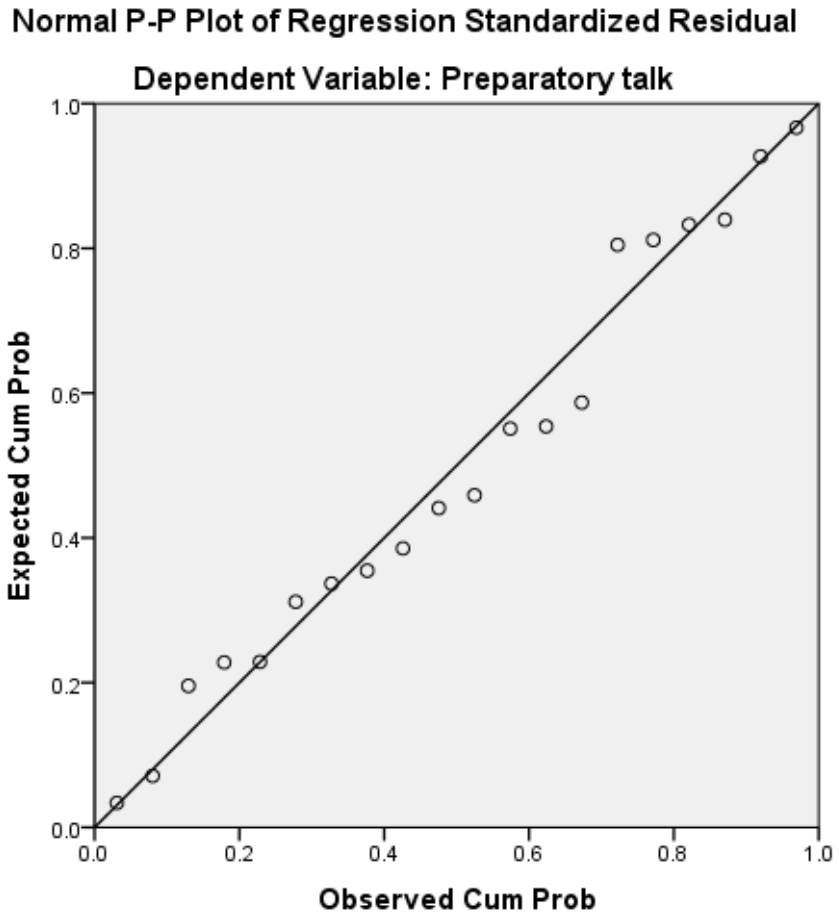
Appendix F- Scatterplot of standardised residuals against standardised predicted values (strong commitment regression analysis)



Appendix G- Histogram illustrating the distribution of the residuals (preparatory talk regression analysis)



Appendix H- Probability-probability (P-P) plot of expected and observed values (preparatory talk regression analysis)



Appendix I- Scatterplot of standardised residuals against standardised predicted values (preparatory talk regression analysis)