Understanding the Therapeutic Process: Mechanisms of Motivational Interviewing in Weight Loss Maintenance

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Summary

Background

Nearly a quarter of UK adults are obese representing a significant public health problem. Motivational interviewing (MI) may be effective in helping people to lose weight. Planning could be a mechanism of action which is related to outcome. The aim is to define the types of planning talk used by clients during an MI session and examine their relation to weight loss maintenance (WLM) outcomes. Also to examine the skills the therapist used prior to a client talking about planning.

Methods

To define planning talk a literature review was conducted and an expert group listened to recorded MI sessions. Thematic content analysis was used to identify the types of planning talk. Thematic analysis was used to identify the therapist skills prior to planning within 50 MI sessions. Associations between types of planning talk and WLM outcomes were analysed using logistic and linear regression.

Results

The development of the coding system found several types of plans/goals. The reliability was 86% and 75% agreement with the gold standard, for examples of plans/goals and the transcript respectively. Frequent planners lost on average 2.8 kgs (95% CI) and 1.2kg/m² (95% CI) more than those who were low planners (not statistically significant). Medium goal setters statistically significantly increased on average their weight (8.8kg) and BMI (3.5 kg/m²) compared to low goal setters. Therapist's skills prior to planning were asking the client planning questions and exploring with the client their planning ideas in order to increase specificity.

Conclusion

The coding system can be used to code WLM data with acceptable reliability. A possible association between planning and a decrease in weight and BMI was demonstrated. Understanding how MI works could lead to improvements in the practice of MI by therapist, efficacy, focus research efforts and facilitate a better understanding of what helps people to change behaviours.

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Glossary of abbreviations

MI	Motivational Interviewing
WLM	Weight loss maintenance
WHO	World health organisation
BMI	Body Mass Index
NHS	National health service
RCT	Randomised control trial
WILMA	Weight loss maintenance in adults trial
MIP	Motivational interviewing practitioners
MITI	Motivational Interviewing Treatment Integrity scale
IPAQ32	The International Physical Activity Questionnaire
DINE33	Dietary Intervention in Primary Care
EDE-Q35	Eating Disorder Examination-Questionnaire
GHQ1236	General health questionnaire
AUDIT-C	Alcohol Use Disorders Identification Test
HSI	Heavy Smoking Index
TSRQ	Treatment Self-Regulation Questionnaire
MIMIC	Motivational Interviewing in Weight Loss Maintenance study
NICE	National Institute for Health and Care Excellence
SDT	Self-Determination Theory
TTM	Transtheoretical Model of Change
CDT	Cognitive Dissonance Theory
OSAS	Obstructive Sleep Apnea Syndrome
MIO	Motivational interviewing only
MIF	Motivational interviewing with feedback
MICO	Motivational interviewing consistent behaviours
MI-SCOPE	Motivational Interviewing Sequential Code for Observing Process Exchanges
MIIN	Motivational interviewing consistent behaviours
HAPA	Health action process approach
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
MET	Motivational enhancement therapy
CASP	Critical Appraisals Skills Program
SD	Standard deviations
CBT	Cognitive behavioural therapy
MISC	Motivational Interview Skills Code
CLEAR	Client Language Easy Rating
OSOP	One sheet of paper technique
IQR	Interquartile range
PID	Participant identification
BECCI	Behaviour change counselling index
EAGEL-I	Evaluation of AGenda mapping skiL Instrument
MISTS	Motivational Interviewing Supervision and Training Scale

1. Chapter 1: Introduction

"We create our fate every day . . . most of the ills we suffer from are directly traceable to our own behavior." Henry Miller

1.1 Introduction

Worldwide obesity has become a significant public health concern with the rate of obesity doubling since the 1980s [1]. The causes of obesity are complex and multi-level [2] and genetic factors are known to contribute, however, "the presence of the genetic propensity to gain weight does not mean that an individual will become obese. Customary diet and lifestyle factors play a major role" [3] As Miller states "we create our fate every day" and people's behaviour has a key role in causing obesity. Changing behaviours related to weight is therefore an important focus for health improvement.

Many approaches to tackling obesity have been taken, including medication, surgery, large-scale public health interventions and individual one-to-one counselling techniques. One of the many counselling approaches that have been used is Motivational Interviewing (MI) which shows promise with this client group. However, we do not as yet understand exactly how MI works, one potentially important 'active ingredient' is planning. Planning is a recently added stage to the MI process and research has indicated that planning has an important role in behaviour change.

This thesis will present an exploratory study that investigates the use of planning within MI delivered to help people maintain weight loss. This thesis will define planning, describe the development and reliability testing of a measure of planning and then go on to look at associations between planning and weight loss maintenance (WLM) outcomes. Finally it will examine the therapist skills used prior to the client talking about planning.

The current Chapter will describe the complex problem of obesity and interventions used to help people lose weight and encourage long-term behaviour change. It will also summarise the literature on obesity and MI and briefly explore planning and its influence on behaviour change. Finally the rationale and aim of this thesis will be

outlined. An in-depth review of the weight loss maintenance, MI and planning literature will be presented in Chapter 2.

1.2. Obesity: The problem

Obesity has become a significant problem in many countries around the world. A report from the World Health Organisation (WHO) [1] in 2013 states that in 2008, more than 1.4 billion adults were overweight worldwide, which is 34% of the world's population. Overweight and obesity is defined by the WHO as "abnormal or excessive fat accumulation that may impair health" [1]. Body mass index (BMI) is a weight-for-height index that is used to measure an adult's weight status to inform a person if they are underweight, healthy, overweight or obese. A BMI greater than or equal to 25 kg/m² is defined as overweight, and a BMI that is greater than or equal to 30 kg/m² is defined as being obese and a BMI of 40 kg/m² is morbidly obese [1].

Within England just over a quarter of adults were classified as obese in 2010, having a BMI of 30kg/m² or over [4]. This puts a significant strain on the NHS as obesity is associated with a wide variety of health problems. These include type 2 diabetes, heart disease, high blood pressure, stroke, some cancers and depression. Obesity also has an impact on people's quality of life [5]. At the most severe end of the spectrum it can lead to death, with overweight and obesity being the fifth leading risk factor for global deaths. Each year around 3.4 million adults die globally due to being overweight or obese [1]. A weight loss of 5–10% is associated with an improvement in several established risk factors for cardiovascular disease, e.g. hypertension, dyslipidaemia, reduced incidence of type 2 diabetes, as well as improvement in control of diabetes [6]. Interventions successfully tackling obesity could take some of the strain off the NHS as obesity alone, according to the Department of Health in 2011, it costs the NHS £5 billion a year [7].

1.3 Weight loss interventions

Many adults do manage to lose weight through dietary or physical activity changes [8]. However a significant proportion struggle to lose weight and have a life long battle with fluctuating weight. Diet, exercise and behaviour modification programmes have been found to produce an initial weight loss of about 10% [9]. A systematic review [10] looking at different weight loss interventions found that diet alone, diet and exercise and meal replacement led to approximately 3 to 4 kg (3% to 4.3%) of weight lost and maintained at 24, 36, and 48 months, with no groups returning to their baseline

measurements. They also looked at weight loss medications and found that weight loss was initially similar to the diet and exercise regime but at 24 months mean weight loss was higher than with diet and exercise. Finally the review looked at very low energy diets which led to large weight losses but this was followed by fast weight regain.

Behaviour change techniques have also been linked to weight loss. A recent systematic review found that at 12 weeks self-monitoring ($p=<0.001$) relapse prevention ($p=0.02$) and prompting practice ($p=<0.001$) were linked to more successful outcomes. These could therefore be effective techniques to use within weight loss interventions.

A number of different counselling interventions have been found to have an effect on weight loss [11 12]. A meta-analysis [11] of dietary counselling found that compared to usual care there was a mean treatment effect of a 6% initial body weight loss at 1 year which is clinically significant. Another counselling technique which has been used to help people lose weight is MI. A systematic review [13] identified 11 RCTs that examined the effect of MI on weight loss. They found MI significantly improved weight loss compared to control as the MI group lost 1.47kg more than the control group at 6 months. In a further meta-analysis [14] it was found that MI had a statistically significant positive impact on weight.

Further consideration of effective interventions for weight loss can be found in Chapter 2

1.4 Weight loss maintenance interventions

Although weight loss is attainable by many people, maintaining weight loss often proves difficult. About one third of weight lost is regained during the following year and people are usually back to their baseline weight in three to five years [15]. It is therefore important to look at ways to help people maintain their weight loss regardless of how they have lost weight, since health benefits will accrue with longer term weight loss maintenance. There are few studies and reviews looking specifically at weight loss maintenance interventions, studies/reviews have been included here if they examine long-term weight loss (and therefore maintenance) with at least one year follow-up as well as those where the interventions being tested have a distinct focus on maintenance of weight already lost. A one year follow up was chosen as it is in line with Wing and Hill's (2001) definition of weight loss maintenance [16].

A meta-analysis [6] looking at a variety of weight loss maintenance interventions found promising methods for reducing weight regain including some medications such as orlistat and sibutramine, inclusion of caffeine, added dietary protein, adherence to physical activity, continued weight-loss therapist contact, consuming fewer calories from fat, and alternative strategies such as acupressure. However the authors state that data on long-term weight loss maintenance is lacking making interpretations about the long-term effects of interventions difficult. A rapid review [17] conducted recently suggested similar approaches but also recommended the use of ongoing regular support/follow-up and behavioural techniques such as goal setting, relapse prevention and self-monitoring of weight. The authors also noted a lack of long-term data and methodological issues with trials including high levels of attrition which is likely to be associated with weight loss maintenance failure. Finally, evidence from a review by Franz et al (2007) [10] indicates that achieving long-term weight loss may be more likely if individuals implement more than one strategy. This is also further explored in Chapter 2.

1.5 Why motivational interviewing?

This Section seeks to explain why the Weight Loss Maintenance in Adults (WILMA) trial [18] (some of the data presented in this thesis were collected as part of this trial-see below) and this thesis focuses on MI as an intervention to help with WLM. It will explain what MI is and give a brief review of the studies that have looked at MI and WLM. This will be further explored in the literature review (Chapter2). MI was designed to change complex behaviours such as addictions. WLM is complex and involves changing a number of different behaviours therefore MI was considered potentially useful in this area.

1.5.1 What is motivational interviewing?

MI is an intervention designed to enhance patient's motivation for change and adherence to treatment. "MI is a collaborative, goal-oriented style of communication which pays particular attention to the language of change. It is designed to strengthen personal motivation for and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and

compassion" [19]. There are four key processes that happen within MI counselling sessions; engaging, evoking, focusing and planning.

There have been a number of reviews looking at the effectiveness of MI in relation to health outcomes [12 14 20-22]. It has been found that MI can have a positive and statistically significant change in health outcomes such as cholesterol level, body weight and HIV viral load [14]. This explanation will be further explored in Chapter 2.

1.5.2 Motivational interviewing and weight loss maintenance
There are few studies that look at the effects of MI on long-term weight loss. This Thesis will explore both WLM and long-term weight loss, therefore any studies looking at MI and weight loss at 12 months or over are of interest. A one year follow up was chosen as it is in line with Wing and Hill's (2001) definition of weight loss maintenance [16]. This will be further explored in Chapter 2. Many studies looking at MI and weight loss do not have a long follow-up period with the majority of them having a follow up period of 6 months or less after the end of the intervention. However, there are a few that look at long-term weight loss and MI. These studies have found that MI is effective when addressing longer term weight loss.

Groeneveld et al (2010) [23] found that at 12 months, body weight had significantly decreased as a result of the intervention. West et al (2007) [24] found that at 18-months weight loss between conditions differed significantly, with a 3.5± 6.8 kg loss in MI intervention and 1.7±5.7kg in control participants. Finally Hoy et al (2009) [25] discovered at five years, that women in the intervention group weighed significantly less (6.1lbs) than controls. However it is hard to say whether MI or the low fat eating plan contributed to the effects seen as the study did not look at them separately.

In summary, although evidence is limited these studies suggest that MI may be helpful for longer term weight loss. However, to date we have a limited understanding of the mechanism of action of MI [26]. It is important to understand how MI works as this could lead to improvements in practice and a better understanding of what helps people to change their behaviour [27]. None of the above studies address how MI works within the weight loss context. It is therefore an unanswered question that should be explored in order to improve the success of MI in this area.

1.6 The WILMA trial

A further study that also looks at MI and WLM is the WILMA study [18]. The data on which this Thesis study is based comes from the WILMA study [18], a brief description of which is given below. The WILMA study [18] tested a weight loss maintenance intervention that combined professional support with self-monitoring. It was a 3 arm randomised control trial evaluating a 12 month MI intervention with self-monitoring for WLM. The trial comprised three arms which were: an intensive intervention arm, a less intensive intervention arm and a control arm. The intensive arm received 6 face-to-face MI session and then 9 phone sessions. The less intensive group received 2 face-to-face MI sessions and 2 phone sessions. The control group received an information pack on maintaining weight loss. Individuals were followed up at 6 months during the intervention and at 12 months at the end of the intervention.

1.6.1 Sample

The participants in the WILMA study [18] were obese adults both men and women aged 18-70 years with current or previous BMI of 30+ who had intentionally lost at least 5% body weight (by pharmacological, lifestyle and/or behavioural methods) during the previous 12 months and with independent verification of weight loss. Exclusion criteria were as follows: inability to comply with the protocol such as previous bariatric surgery (unless fully reversed e.g. by removal of a gastric balloon), terminal illness, poor competence in English (i.e. inability to complete study materials), living with another study participant and pregnancy in women.

1.6.2 Method

The participants were consented and baseline data were collected. Participants were then randomised to either the intensive, the less intensive or control group. The intensive and less intensive participants started their MI sessions and received either six or two sessions depending which group they were in. During the first MI session the Motivational Interviewing Practitioners (MIPs) were instructed to ask participants for written informed consent to record the MI sessions. The MIPs were asked to record every session they had with the participants they were assigned, where informed consent was given. These recorded sessions included participants who had been assigned to the intensive and less intensive arms of the study and comprised both face MI sessions and shorter telephone sessions. The sessions were recorded on a Dictaphone and the audio file was then transferred to a computer. The sessions were

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coded with the participant's ID number, the date the session took place and the session number. The files were transferred onto an encrypted USB stick and sent to the study team.

At 6 months all trial participants were sent a postal questionnaire to complete, details of the outcomes collected can be found in Table 2a below. At 12 months all participants were asked to attend a face-to-face appointment to collect follow-up outcome data.

The fidelity of the MI intervention was also measured. Therapists were assessed using the Motivational Interviewing Treatment Integrity scale (MITI) [28] prior to entering the study to ensure they could deliver MI at least at a 'proficiency' level as measured by the MITI scale. During the intervention recorded sessions were used to assess fidelity. Four raters were trained in MITI rating and their inter-rater reliability was checked using a multi-rater Kappa and an intra-cluster correlation coefficient. Each therapist that had at least four recordings was assessed for fidelity by each rater, therefore each rater checked one randomly selected session from each therapist. Therapists that had less than four recordings were checked for fidelity but were not divided between the raters and their session was not randomly selected.

A cost-effectiveness evaluation comprising preliminary cost utility analysis was undertaken in order to estimate economic parameters and unknowns for future research.

1.6.3 Intervention delivery

Fifteen therapists delivered the MI sessions and they had a variety of different backgrounds including dietetics, addiction and mental health. The therapists had all been trained in MI and had experience of using MI in practice. At the time of the trial 12 out of the 15 therapists were currently using MI. They all were educated to at least degree level or equivalent. The majority were female with only four being male.

Table 1: MI practitioner demographics

	%	N
Nursing or health background	67	10
Experience of working in the field of obesity, diet or physical activity	40	6
MI trainer (higher level MI qualification)	67	10
Currently using MI in health related area	80	12
Counselling qualification	93	14

The therapists were also trained by the WILMA project in MI, and additionallyin what were termed "hot topics". These "hot topics" were aspects that according to research evidence may be important to weight loss maintenance. The hot topics were to be used flexibly within the MI sessions. The hot topics included goals setting, implementation intentions (specific plans), habits, emotional eating, self-esteem, self-monitoring and coping with relapse. The therapists were therefore instructed to talk about planning and goal setting with the participants. Therapists were also instructed at the end of each session to rate the session for how much the hot topics were discussed. This allowed a record to be kept of which hot topics were used in the session, and to what extent.

1.6.4 Outcomes

Table 2a lists the outcomes that were assessed and at what time point they were collected. Table 2b and 2c list the mediators and moderators being measured as part of the trial.

Table 2a: Outcomes

Outcomes	Measure	When
Body Composition		
BMI (weight & height)	Calibrated digital	B, 12m
Waist and hip circumferences	Tape	B, 12m
Other		
Physical activity	The International Physical Activity Questionnaire (IPAQ32)	B, 12m
Diet	Dietary Intervention in Primary Care (DINE33)	B, 12m
HR quality of life	EQ5D 34	B, 6m, 12m
Health and other resource usage	Case Report Form	B, 6m, 12m
Proportion maintaining Weight loss		12m
Binge eating	Eating Disorder Examination-Questionnaire (EDE-Q35)	B, 12m
Psychological well being	General health questionnaire (GHQ1236)	B, 12m
Health-related behaviours (alcohol consumption & smoking status)	Alcohol Use Disorders Identification Test (AUDIT-C) & Heavy Smoking Index (HSI)	B, 12m

Table 2b: Mediators

Outcomes	Measure	When
Social support	Exercise & Eating Habits Social Support Scales	B, 6m, 12m
Self-efficacy	Weight & Exercise Efficacy Lifestyle Scales	B, 6m, 12m
Intrinsic motivation	Treatment Self-Regulation Questionnaire (TSRQ) (diet and exercise scales)	B, 6m, 12m
Implementation intentions	From MI records and interviews	
Automaticity/Habits	Self-report habit index (diet and exercise scales)	B, 12m
Self-monitoring/regulation	Short Self-Regulation Questionnaire	B, 12m

Table 2c: Moderators

Outcomes	Measure	When
Demographics		B
Weight loss history Satisfaction with weight loss Current weight loss goals Reasons for weight loss		B
Binge eating	EDE-Q35	B
Life events	Qualitative interviews	
Psychological well being	GHQ1236	B

1.6.5 WILMA and MIMIC

For this Thesis (Mechanisms of Motivational Interviewing in Weight Loss Maintenance study (MIMIC) I will be utilising the data from the audio recordings of the MI sessions as well as the weight outcome data from WILMA including BMI, weight and weight loss maintenance defined as 12 month weight less than or equal to baseline. The MIMIC study aims to build on the WILMA study [18] and to explore why MI might be effective

in this context. A systematic review will also be presented which examined mechanisms within MI in relation to health behaviours. This further adds to the understanding of how MI works.

1.7 Rationale

There is a lack of understanding as to how MI works [26]. This may be due in part to MI not being based on a theory and/or the quality of studies which have been conducted to date. If the mechanisms were better understood then it could improve the way MI is used by therapists and therefore improve the outcome of therapy [27]. It could improve the way MI is practiced as the therapist could improve their use of skills that are mechanisms of MI and therefore improve outcome. Some work has been completed in the addictions field looking at this issue which is discussed further in Chapter 2. However, the need to understand the mechanisms by which MI exerts its effects has begun to be addressed recently within the field of health behaviours.

1.7.1 Mechanisms and health promotion

When looking at mechanism of action within MI and health behaviour change, there are many different mechanisms that can be examined. There are therapist behaviours including empathy, MI spirit (it is based on three key elements: collaboration, evoking the client's ideas about change and autonomy), questions and reflections (to repeat or rephrase what the client has said allowing deeper meaning to the communication) and client behaviours like change talk (statements by the client revealing consideration of, motivation for, or commitment to change), self-efficacy, self-monitoring, motivation and stage of change. There is, however, only one study, by Pirlot et al (2012) [29] that conducted a mediation analysis (mediation analysis explained in Chapter 3) and studies to date reveal conflicting evidence regarding the different potential mechanisms. Pirlot et al examined the mechanisms of MI within health promotion. They measured MI skills using the Motivational Interviewing Skill Code (MISC 2.1) [30]. They found that counsellor behaviour (MI-consistent behaviours and spirit) predicted fire-fighter's expressions of intention to make positive changes (change talk), and those expressions in turn predicted increased future fruit and vegetable intake. Therefore, total positive client change talk mediated the relationship between counsellor behaviours and outcomes. They also found that empathy was statistically significantly associated with change talk.

There are other studies that have looked at empathy, MI spirit, MI consistent and inconsistent behaviours and self-efficacy in relation to outcome. These studies have inconsistent findings and many of them do not conduct mediation analysis making conclusions about mechanisms of action difficult to make. This will be explored in the systematic review in Chapter 3. Further research into therapist skills, client language, mechanisms of change and health behaviours is needed as it is important to look at what client behaviours lead to change in behaviour but it is also important to understand what specific skills therapists use to elicit positive client behaviour.

1.8 Planning

As demonstrated above client language appears to play a role in the way MI works within the health field. The type of language used in change talk within the health field has been under researched. Furthermore within this change talk there is a process of planning which is part of MI. MI was developed based on the experience of working with clients, therefore including planning within MI has been based on experience of working with clients. Although there is little evidence for the planning process within MI research there has been research conducted on planning in the behaviour change field. Therefore there is potential evidence for including planning in MI but further research needs to be done within MI. There is a gap in research in MI looking at this planning process. Research has been completed looking at how people plan and what types of plans are effective but to the author's knowledge there are only two studies looking at planning within the context of MI [31 32]. One of the studies however does not use full MI in the intervention but rather uses aspects of MI.

It is known from behaviour change research that planning has an important role in behaviour change [33]. Within behaviour change research planning takes many forms such as action planning, coping planning and implementation intentions. According to Orbell and Sheeran (1998) [34] there is a missing link in understanding health behaviour, a 'gap' between intentions and actions as the predictive power of intentions is rather modest. Plans may therefore be the link that helps people turn their intentions to change their behaviour into actual behaviour change. This is further explored in Chapter 2B.

1.9 Conclusions

Obesity is a key public health issue in the UK with nearly a quarter of adults being obese. Weight loss maintenance is a crucial research area as people tend to regain the

weight they have lost over time. If people can maintain a weight loss of 5% it can lead to a reduced risk of diabetes and cardiovascular disease and other health problems.

MI has been shown to help people lose weight and maintain this weight loss up to five years at follow up. However, we currently do not understand how MI works, but identifying in-session indicators of client outcomes is important in determining the mechanisms by which MI works, e.g. therapist skills and the language a client uses. There are many different mechanisms by which MI could work but the only mechanisms looked at within a full mediation analysis to date are MI consistent behaviour, MI spirit and change talk. Change talk has been linked to outcome and has been identified as a possible mechanism in a systematic review [26]. Part of this change talk includes making plans, which has been recently added as a process of MI. Planning has previously been shown to help bridge the gap between intention and behaviours in behaviour change research. Planning has only relatively recently been looked at within the context of MI. Two studies have looked at this, and, one study used an adaptation of MI, using only 3 MI techniques. Therefore more research needs to be conducted to look at planning as a mechanism of MI.

1.10 Aims and research questions

We know from behaviour change research that planning in the form of action planning, coping planning or implementation intentions has an important role in behaviour change. Planning is part of the MI process and there may be different types of planning talk present within MI sessions. These could include talk about non-specific plans to very specific plans like implementation intentions. As previously mentioned, planning could bridge the gap between goal intention and outcome. Therefore it was also important to examine goal setting to test whether, compared to goals setting, planning can improve outcome. The central argument of the thesis is that planning will lead to a decrease in weight, BMI and an increased likelihood of maintaining a weight loss. The initial aim of this thesis was to systematically review studies identifying possible mechanisms underlying the effectiveness of MI in relation to health behaviours. Further to this the aims are to understand planning and based on this to develop a coding scheme, to test the reliability of the coding system and to examine the association between planning and weight outcomes.

We also know from research evidence that there are certain MI skills that are associated with change talk, therefore a key aim is to look at which therapist skills occur prior to planning which could elicit plans.

1.11 Main research question

What are the types of planning talk used by clients during an MI session and are they related to outcome?

1.11.1 Key questions

Phase one

Is it possible to identify planning talk used by clients during MI sessions addressing weight loss maintenance?

Can a reliable measure of planning be developed?

Is it possible to reliably identify and measure forms of planning talk within weight loss maintenance consultations?

Phase two

Does planning lead to a decrease in weight, BMI and an increased likelihood to maintain a weight loss compared to goal setting?

Is more specific planning associated with better outcomes?

Does planning talk vary in commitment strength and is this associated with outcome?

What therapist skills are used prior to planning that may elicit plans from the client?

1.12 Thesis structure

In order to address the above research questions this thesis is structured into a literature review of relevant research, a systematic review of the mechanisms within MI in relation to health behaviours, understanding planning and the development of the coding system, the application of the coding system to the MI session data, the association between planning and WLM outcomes, the skills the therapist used prior to client planning and finally a discussion of the results.

2. Chapter 2: Background

2.1 Introduction

This Chapter provides a more detailed exploration of weight loss maintenance (WLM) research, the role MI could have in WLM and why planning could be a potential mechanism of MI. This Chapter is an overview of the literature relevant to this Thesis. It is not a systematic review and therefore it is not a comprehensive overview of all the literature relating to weight loss/WLM. The Chapter begins with a description of interventions that have been successful in helping people maintain weight loss. MI is described in greater detail and the theoretical links and hypothesised mechanisms of effect are explored. A description is provided of the different mechanisms of MI identified in the addictions field. Finally the Chapter examines the potential role and importance of planning in behaviour change and counselling.

2.2 Weight loss maintenance: successful interventions

There are many different WLM interventions that have been shown to be successful, ranging from surgery to diet and exercise. This Section will discuss these interventions and the available research evidence.

2.2.1 Bariatric surgery

Surgery is one of the interventions offered on the NHS for WLM in order to treat severe obesity. The National Institute for Health and Care Excellence (NICE) guidance [35] recommends that surgery be provided as a treatment option if the patient has a BMI of 40 kg/m² or more which is someone who is morbidly obese, or between 35kg/m² and 40kg/m² and has a disease that could be improved by losing weight. The patient must also have tried all appropriate non-surgical treatments and failed to lose and maintain a weight loss. The patient must also be fit for surgery and commit to long-term follow-up after the operation. Surgery is therefore not recommended for everyone, so is not a treatment option for all people termed as 'overweight' as they have a BMI between 25 kg/m² and 30 kg/m². New NICE guidelines state that an assessment for bariatric surgery should be offered to people who have recent-onset type 2 diabetes and are also obese (BMI of 35 and over). They are also considering an assessment for bariatric surgery for people who have recent-onset type 2 diabetes and have a BMI between 30 and 34.9 [36].

There have been a few reviews [37-40] looking at surgery and WLM which have a variety of different follow up points. Buchwald et al (2009) [37] identified that at 2 years or more follow-up, weight loss was 41.6 kg or 59% of excess body weight loss. A meta-analysis with a 10 year follow-up [39] found that bariatric surgery can achieve a major reduction in weight, at least 50% of weight lost due to surgery, which is sustained for at least 10 years. The authors state that "No other therapy for obesity in use today could approach this degree of weight loss over such a period of time" [39]. This is supported by a systematic review [40] which indicated that bariatric surgery is a more effective intervention for weight loss than non-surgical options. The authors discovered a large reduction in weight loss across the studies, however only 6 studies were included in this review. There is also evidence that bariatric surgery is a cost-effective intervention for moderately to severely obese people compared with non-surgical interventions [40].

In order to maintain this weight loss after surgery it is important that the patient changes their diet, therefore, ongoing lifestyle interventions may be important in this regard [38]. An RCT [41] of participants who had weight loss surgery and were either treated with usual care or a lifestyle intervention following surgery found that weight was significantly lower in the group of participants who received the lifestyle intervention compared to those who did not at 12 months and at 36 months. This demonstrates that although surgery can lead to reduced body weight and maintenance, it is still important to include a lifestyle intervention. Surgery however, is not without risk. It is associated with a 0.5–1% postoperative mortality risk and an increased risk of wound dehiscence, venous thromboembolism, and cardiorespiratory insufficiency [38]. A meta-analysis identified uncertainty in the evidence for surgery and patients with a BMI between 35kg/m² and 39 kg/m² [42]. There are also problems with the quality of studies within the surgical field, which raises significant concerns regarding the validity of current weight loss estimates in these reviews [43]. Surgery does appear to help those who are morbidly obese but with the population of obese people estimated at 24.4% for men and 25.1% for women, by the most recent Health Survey for England (HSE) in 2012, it is unlikely to be a practical or cost-effective way of treating obesity. Other interventions need to be considered.

2.2.2 Weight loss medication

Medication is also used in the treatment of obesity. Reviews have shown it to be an effective means of helping people with initial weight loss and maintenance of that weight loss. One review [38] found that pharmacologic therapy provides 5–10kg weight loss after 1–2 years. A further review [6] discovered that orlistat was more effective for promoting WLM than placebo. When orlistat was compared to diet alone [10] there was a significant difference between the two at 6, 12 and 24 months. Orlistat on average was attributed to more weight loss than diet alone at all 3 time points [10]. Finally, a Cochrane review [44] of 30 RCTs suggests that orlistat, sibutramine and rimonabant compared to placebo reduced weight by around 5 kg and orlistat reduced the number of high risk patients who developed diabetes. These drugs appear to have promise however they do have side effects leading to rimonabant in 2009 and sibutramine in 2010 being withdrawn from the market [45]. Orlistat also has side effects such as fatty or oily stools, needing the toilet urgently, passing stools more frequently, oily discharge from the rectum, flatulence, stomach pain and headaches, however these are not serious enough to have it withdrawn. Although evidence indicates that greater weight loss occurs when medication is used alongside dietary/lifestyle therapy, the weight loss medication may need to be continued as weight regain can occur when patients stop taking the medication [38]. However medications such as orlistat and sibutramine are not approved for longer than 1 and 2 years, respectively [38]. So medications like these are not long-term interventions for WLM. The evidence is also limited by methodological problems with studies included in systematic reviews and more research is required [17].

2.2.3 Diet, exercise and behaviour change techniques

The NICE guidelines have put forward recommendations for the public regarding weight management. The strategies they recommend include dietary approaches such as low fat diet and portion control, exercise such as building activity into the working day and regular self-monitoring of weight or waist measurement. The focus of this Chapter in terms of interventions and techniques considered are in line with the main recommendations from NICE **[35]**.

2.2.3.1 Diet and exercise

Improving diet and increasing physical activity are the key lifestyle interventions to help people maintain their weight loss. People need to ensure that they eat a healthy diet in order to maintain weight loss. Wing et al (2001) [16] indicated that the people who

were most successful at maintaining weight loss reported eating a low fat, high carbohydrate diet. Systematic reviews and meta-analysis of WLM studies have found that diet plays an important role. WLM is associated with a lower total calorie intake and a reduction in portion size [46]. The frequency of eating is also associated with WLM, as reducing snacking frequency helped people maintain [46]. A systematic review by Douketis et al (2005) [38] has also indicated that diet is important in WLM. The results showed that dietary/lifestyle therapy provides a 5 kg weight loss after 2–4 years. A further review [10] supported this as they ascertained that diet alone led to a mean weight loss of 4.6kg to 4.4kg to 3.0kg at 12, 24, and 48 months. When looking at very low calorie diets and weight loss one review [10] demonstrated large weight loss but also rapid weight regain. However, 5% of the weight participants lost was maintained at 36 months. Very low calorie diets may not be sustainable in the longer term and there are health risks associated with these diets [47]. The long-term success rate for people who use diet alone to treat their obesity is only 15% [48] which indicates that for most people diet alone is not enough to help them maintain weight loss.

A review [46], found that physical activity was associated with WLM. This is due to physical activity expending energy which can balance out caloric intake. Exercise and activity is defined as planned, structured, and repetitive for the purpose of conditioning any part of the body. Sedentary behaviour is defined as sitting or lying down. One study [49] of WLM comparing successful and unsuccessful weight maintainers identified that a significantly higher proportion of successful maintainers reported exercising 30 or more minutes daily. People who have been successful in maintaining weight loss reported that physical activity had been an important part of their weight maintenance strategy. A systematic review [50] indicated that when diet and physical activity are combined weight loss is greater than diet alone in obese and overweight individuals at 1 year of follow-up. This indicates that it is important to address both diet and physical activity in order to be successful at maintaining weight loss.

2.2.3.2 Self-monitoring
One evidence-based technique that can help people maintain weight loss is self-monitoring. People can either self-monitor their weight by weighing themselves on a frequent basis or self-monitor their food intake by counting calories, weighing food or utilise portion control. Researchers have recommended self-monitoring within the WLM field as it can increase awareness of weight and its relation to energy intake and

expenditure [46]. By facilitating tracking of weight it means that slips can be more easily rectified. A qualitative study of WLM found that being more aware and vigilant to weight control is a key characteristic of weight maintainers [51]. One systematic review [52] of weight loss identified that all 15 of the studies included that looked at dietary self-monitoring found significant associations between self-monitoring and weight loss. Within this review [52] there was also 5 studies that used diaries to monitor exercise, however only one [53] of the studies looked directly at the role of self-monitoring of exercise in relation to weight loss. The study discovered that self-monitoring led to significantly greater weight loss but those who self-monitored also experienced fewer difficulties with exercise and exercised more often. When looking at the self-weighing studies included in the review, there was significantly greater weight loss amongst those who weighed daily to weekly than those who self-weighed less often [52]. Finally, a study [49] of WLM that compared successful and unsuccessful weight maintainers identified that a significantly higher proportion of people who were successful at losing weight reported planning meals, tracking calories, and tracking fat. A higher proportion of successful losers also reported measuring the amount of food on their plate.

2.2.3.3 Social support

Social support can come in many forms and from a number of sources including spouse/partner, family, friends and weight loss group support and has also been shown to be important in WLM. A recent RCT [54] of diet change and weight loss with the inclusion of group social support indicated that those who received social support regardless of the diet they followed lost more weight at year 1 and 2 compared to those who did not receive support. This indicates that social support can play an important role in WLM. Social support from partners, family, friends, or others has also been shown to be helpful [10]. A systematic review [55] identified 16 RCTs looking at social support and weight control, weight maintenance or weight-loss interventions. From these 16 studies eight investigated spouses and the other investigated children and parents. When looking at spouse support the authors identified in three studies, participants and spouses together produced significantly greater effects at 1 year follow-up compared to participants alone [55]. Two further studies did not reach statistical significance. However, the evidence is inconsistent as the review also identified three studies that suggested treating participants alone produced greater weight loss than treating participants and spouses together, at 1 year follow-up. Group-based support can

also be important in WLM as it can allow people in similar circumstances to help each other achieve their goals. One weight loss RCT [56] designed to help men lose weight delivered a group-based programme addressing healthy eating and physical activity which indicated that the men valued the camaraderie and the friendly, relaxed, non-directive manner in which the programme was delivered. The group setting of the intervention helped the men to foster peer support which in turn enhanced their weight loss [56].

2.2.4 Internet

Although not a behaviour change technique, using the web or internet to deliver obesity interventions to enhance WLM efforts could be a cost effective way of helping people on a larger scale. However, there is limited evidence of effectiveness and the research to date often has methodological limitations. A rapid review by Simpson et al (2011) [17] identified some evidence that web based interventions may be useful in WLM. A meta-analysis [57] demonstrated significantly greater weight change in web-based WLM interventions compared with controls. It also suggested that web-based interventions achieve similar weight loss maintenance to face-to-face programmes. However this was only based on two heterogeneity studies making it hard to draw conclusions. Further support for internet interventions has been demonstrated in another review [6] examining Internet-based interventions with in-person group behavioural therapy sessions. They found mixed results, with two out of the four studies included finding a difference in WLM between groups [6]. However, a well conducted RCT [58] of weight loss tested an internet based weight loss programme called eDiets and discovered that at 1 year participants in eDiets.com lost 1.1% of their initial weight, and those who used the weight loss manual lost 4.0%.

2.2.5 Summary

There are a variety of different techniques that people can use to lose weight and maintain weight loss. Surgery appears to be a very successful strategy however there are associated risks with the evidence base. Diet and exercise seem to be the key aspects associated with WLM. Self-monitoring and improving social support appear to be other helpful strategies. Internet based interventions may be effective however more research is needed in this potentially fruitful area. Finally, there is evidence from the review by Franz et al (2007) [10] which indicates that achieving long-term weight loss may be

more likely if individuals implement more than one strategy. The next Section will explore motivational interviewing as a potential intervention for WLM.

2.3 What is motivational interviewing?

As already briefly discussed in Chapter 1 MI is a counselling approach that is designed to build a client's confidence and motivation for change and focus on eliciting the client's reasons for behaviour change. It helps clients to explore and resolve ambivalence. The therapist creates an atmosphere that is conducive to change by following the skills of MI and encompassing the spirit of MI. MI originated in the early 1980's to facilitate behaviour change and as a treatment for alcohol abuse. Miller and Rollnick developed MI to be less confrontational, authoritarian and directing than other counselling styles around at that time. MI was developed by William Miller as a result of a feeling that many counsellors in the alcohol field were somewhat disparaging of the people they were treating. They saw them as being defensive and in denial about reality, however this was not Miller's experience. Miller found his clients to be open and aware of the problems that their drinking was causing. Miller recognised that many counsellors in the 1980's were authoritarian, confrontational and used a directing counselling style. This was in opposition to his style in which he listened to clients and tried to understand their dilemma [19]. Miller developed MI based on an inductive process of viewing tapes with postgraduate Norwegian Students [59]. From this he began to develop MI which set out to address these issues. In 1989 Miller, met Stephen Rollnick, which resulted in the co-foundation of MI. This led to the fundamental concepts and approaches being expanded upon in more detailed and the description of clinical procedures. MI addresses the therapist 'Righting Reflex' where therapists have the desire to 'fix' what seems to be wrong and tell the client how to change. MI tries to evoke an individual's own motivation for change and ideas about what they can do to change. This ensures that the change comes from the client's voice and not the therapist. MI also addresses the issue of the ambivalence regarding change that therapists find with their clients [19]. MI originated in the alcohol and addictions field but has now been applied to many areas of health care and also to weight loss.

There are four key processes that happen within MI counselling sessions; engaging, evoking, focusing and planning. These processes are the different phases that the MI therapist uses to engage the client and practice MI. The first of these processes is engaging, which is the process of establishing a "mutually trusting and respectful

helping relationship to collaborate toward agreed-upon goals" [60]. The next process is focusing which involves "clarifying a particular goal or direction for change" [60]. Evoking is the third process which occurs when the "therapist elicits the client's own motivation for a particular change" [60]. The final process is planning, which involves developing a specific change plan that the client is willing to implement [19]. Planning has recently been added as a component of MI, but as MI was developed by an inductive process, there is as yet no evidence base to support the inclusion of planning. There is evidence from the behaviour change literature however to suggest planning may improve outcomes, and it is hoped this thesis will add to this research. The processes within MI are not sequential and can be used at any time during the MI session according to where the therapist feels the clients is and will adjust this if it is not working with the client. MI therefore aims to take the client through these different processes in order for them to successfully change their behaviour. The process helps make complex behaviour changes such as weight loss feel clear and more achievable by allowing the client to decide on the changes in their life that they feel they can make.

2.4 Theory and motivational interviewing
2.4.1 Introduction

MI is recognised as an approach that is not based on any one particular theory [61]. It has been linked to various different theories such as Self-Determination Theory (SDT), Transtheoretical Model of Change (TTM) [62] and Cognitive Dissonance Theory (CDT). There is a lack of understanding of the processes and efficacy of MI. By understanding the theories that have been linked to MI it is hoped that they will help to explain the processes and efficacy of MI. If there is a better awareness of this it could inform future developments and research into its methods and applications in practice ,for example, it could focus training and practice on the necessary mechanisms for the efficacy of MI [63]. This Section will summarise these theories and how they have been linked to MI.

2.4.2 Self-determination theory

SDT is a theory about human self-motivation to change behaviour. The main principle of SDT is that "people have an innate organisational tendency toward growth, integration of the self and the resolution of psychological inconsistency" [64], which is also a principle of MI. SDT seeks to explain what drives people to behave the way they

do. It focuses on motivation and defines it as psychological energy which focuses on a goal [65]. The theory identifies that motivation lies on a continuum of autonomy, from external regulation to intrinsic regulation. Intrinsic regulation is defined as engaging in behaviors because they provide inherent satisfaction such as fun, interest, or the challenge they offer [66]. Extrinsic regulation is defined as engaging in behaviours for an outcome that is external to the person such as social acceptance [65]. It therefore examines the different motivations people have for achieving goals, e.g. are people motivated because they enjoy the behavior or is it because they have been told to perform the behaviour [67]. SDT is interested in the process of how people can change their motivation from extrinsic to intrinsic [68].

SDT has identified three psychological needs critical to supporting the process of internalization and the development of optimal motivation: competence support, autonomy support and relatedness. MI has been linked to SDT as it provides support for each of the psychological needs which are identified by SDT. MI supports autonomy as it avoids confrontation and encourages clients to present arguments for change themselves which can lead to them choosing their preferred course of action therefore supporting autonomy. The need for relatedness that is identified by SDT is addressed in MI through the counsellor expressing empathy, support and a genuine interest in the client. Finally competence is supported by MI through helping the client to set appropriate self-selected goals and helping the client to have realistic expectations [65].

SDT has also been used within the context of weight loss and physical activity. One trial of individuals that were enrolled in a weight loss programme for the morbidly obese, ascertained that participants with greater autonomous self-regulation had better adherence to the program and also had greater reductions in BMI [69]. Another trial implemented an intervention based on SDT for overweight and obese women. They found at one year follow up that compared to control the SDT intervention group achieved greater weight loss [70]. SDT interventions have also been effective in increasing physical activity leading to weight loss. Finally a RCT [66] looking at the impact of a one year intervention based on SDT, indicated that SDT can be successfully implemented within a weight management intervention whereby it increased the autonomous forms of behavioural regulation. The SDT intervention also led to clinically-significant weight reduction, when compared to a control condition [66].

2.4.3 Transtheoretical model of health behaviour change

TTM was developed to integrate different behaviour change theories that existed within psychology. TTM includes four dimensions; Stages of changes, Process of change, Self-efficacy/ Temptation and Decisional balance. The TTM proposes that behaviour change happens through a series of stages [71]. These stages include pre-contemplation, contemplation, preparation, action, maintenance and termination. These are the processes of change that people go through when attempting to change their behaviour [71]. The pre-contemplation stage occurs when people are not intending to take action towards change for the foreseeable future. Contemplation happens when a person has the intention to change their behaviour. They are aware of the pros and cons of changing, however, they are more aware of the cons. Preparation is when an individual is intending on changing in the very near future and has a plan of action. The action stage is defined when the individual has made changes to their lifestyle. Maintenance is determined by the individual working to prevent relapse and not having to apply the change process as often as people in the action stage. Finally termination is when the person has no desire to go back to their old behaviour [71]. TTM therefore treats behaviour change as a "dynamic rather than an all or nothing phenomenon" [72]. The Process of change explains how people move through the stage of change. There are 10 strategies involved, five are experimental which happen earlier and five are behavioural which happen later during the stage transitions. Self-efficacy is part of the model as it can increase when the individual copes with behaviour change without relapsing, therefore moving through the stages of change. Finally decisional balance is used to weigh up the pros and cons of change. The use of this varies across the stages of change and the type of behaviour change [73].

In clinical practice in the 1980's many counselling interventions assumed that their clients were at the preparation or action stage of the TTM. However the TTM emphasised that most people with addictions were not at this stage and had not yet decided if they wanted to change. The TTM suggested that interventions should be adjusted to fit the person's readiness for change rather than blaming individuals for being unmotivated [74]. The TTM also assumes that the stages of change are stable but also open to change. One intervention that is aimed at increasing readiness for change is MI. The stages of TTM also provided a logical way to think about the role of MI in

helping people to move through these stages. However MI and TTM are distinct and one is not based on the other. The TTM is a conceptual model of change and MI is a clinical method that helps people enhance their motivation [75].

The TTM has been used with weight management studies [76 77]. An RCT [78] exploring the impact of a tailored, home-based, TTM-based intervention to target behaviours associated with healthy weight in participants who were obese or overweight identified there were significant treatment effects for healthy eating, exercise and managing emotional distress. This demonstrates that an intervention based on TTM could have an impact on weight related outcomes. A meta-analysis [72] of 71 studies using at least one core construct of TTM to improve physical activity found that in general there is support for the application of TTM in the physical activity field. Most results were in the direction of change that has been suggested by TTM. TTM seems to offer a promising framework for weight management interventions [78].

2.4.4 Cognitive dissonance theory

CDT was developed by Leon Festinger in 1957 and focuses on the relationships between cognitions. A cognition is defined as a piece of knowledge/ thought that someone has which could be about a behaviour or attitude. CDT is based on the idea that a person can simultaneously hold two cognitions that are in opposition to one another. When this happens the person is said to be in a state of cognitive dissonance [79]. The individual experiences a psychological tension which can be unpleasant. The tension that is experienced has drive-like properties which can motivate a person. The individual is motivated into action to alter their cognitions to reduce their experience of dissonance [79]. The tension is typically reduced by changing one of the cognitions, or adding new cognitions until mental `consonance' is achieved [80]. In 1984 Cooper and Fazio [76] challenged the dominant assumption that dissonance was driven by a need for psychological consistency. They published a new model which stated that dissonance is aroused when people perceive that their behaviour has been responsible for bringing about consequences that are unwanted or aversive. If there are no such consequences, then inconsistent behaviour will not produce the state of dissonance [80].

Miller has explored the link between MI and CDT [63]. Within MI, therapists focus on change talk and encourage the client to argue for change. This is seen to have change promoting value and has been linked to CDT [63]. One MI technique which is used is

developing discrepancy. During MI clients can become aware of the reasons why change is needed but they are also still aware of the reasons why they do not wish to change. This creates a dissonant state, where clients' reasons to change are seen to be in conflict with their behavioural patterns. MI creates a realisation of how the problem behaviour conflicts with strongly held cognitions such as attitudes, values and beliefs. Exploration of these inconsistencies should lead to a powerful dissonant state. This in turn should help clients move towards behaviour change [79]. This link between MI and CDT which could explain some of the changes in behaviour created during MI.

2.5 Motivational interviewing, weight loss and weight loss maintenance

This next Section will summarise the studies that demonstrated the effectiveness of MI on weight loss and then consider the evidence for the use of MI within WLM and long-term weight loss.

2.5.1 Motivational interviewing and weight loss

In a systematic review Armstrong et al (2011) [13] looked at the effectiveness of MI in weight management studies. This review is the first to look at MI and weight loss studies alone. The authors identified 11 RCTs which examined the effect of MI on weight loss, with a follow up period varying from 3 to 18 months. There was a significant reduction in body weight of -1.47kg for MI compared to the control group. However, they identified for BMI an average loss of -0.25 kg/m^2 for the intervention group compared to the control, which was not statistically significant. These findings strengthen an earlier systematic review's [20] results of MI in health care settings which found MI had high face validity but the quality of the trials needed to be improved.

A meta-analysis [81] supported using MI to reduce BMI. The combined effect estimates for the impact of the intervention on BMI was 0.72. The authors suggested that the size of the decrease of BMI implies that motivational interviewing could be used when trying to help people to lose weight. Another review by Martins et al (2009) [82] indicated that patients who received MI showed a decrease in BMI. This review reported that from eight studies looking at MI and weight loss there was a significant improvement in weight loss when MI was delivered. Finally a recent systematic review [14] looking at the effects of MI delivered by a variety of practitioners including mental health professionals, nurses, dieticians and physicians, in general medical care settings

across a range of problem behaviours found that use of MI by healthcare practitioners led to a statistically significant impact on body weight in ten studies.

2.5.1.1 Summary

These reviews all demonstrate that MI can be effective in helping people with weight loss in a general medical care setting as well as a more specialised counselling setting. The studies included within these reviews [12 82] comprised significant variability in the number of MI sessions delivered, ranging from 1 to 8 sessions and in the amount of training given, which ranged from no specified training to 6 days of training. Many of the included studies did not conduct fidelity assessments using the MITI. They did however provide supervision to the therapists. About a quarter of studies included in the reviews had a samples size of 60 or below so could have been underpowered. There were also some studies that included all females and others where the majority of participants were female, therefore men were under-represented in these studies. In the Martin et al review (2009) [82] there was a lack of treatment control studies and a lack of power across some studies. Therefore although the review shows that MI is effective in helping people with weight loss there are issues with the studies included which could have affected the results. With such high heterogeneity between the studies in terms of quality, the results of the review should be interpreted with caution. Many studies included in meta-analyses and systematic reviews of MI and weight loss have a follow-up period of less than 12 months. This therefore does not demonstrate the long-term effectiveness of MI on weight loss and maintaining weight lost. The next Section in this Chapter will look at the effectiveness of MI for WLM.

2.5.2 Motivational interviewing and weight loss maintenance

There are not many studies that look at the effects of MI on WLM, and of these, fewer still with longer than 12 months follow-up (see Chapter 1 Section 1.5). So studies with at least a 12 month follow-up will be included here and considered as 'maintenance' studies. The introduction (Chapter 1) outlined a few studies showing support for the effectiveness of MI for WLM. Both Groeneveld et al (2010) [23] and West et al (2007) [24] identified that MI led to a significant decrease in weight loss at 12 months compared to controls. There are three additional studies which have also found support for the use of MI for WLM. One of these studies [83] looked at combining a Mediterranean diet with MI to help obese patients with Obstructive Sleep Apnea

Syndrome (OSAS). At 12 month follow up the intervention group had statistically significant weight loss reductions relative to the control group.

An RCT [84] compared weight-loss support intervention delivered remotely through the telephone (along with a study-specific Website, and e-mail) with in-person support during group and individual sessions (along with the three remote means of support, telephone, website and email) and a control group. Participants were followed up at 24 months and mean percentage change in weight was -1.1% for the controls, -5% the group receiving remote support only and -5.2% for the group receiving in-person support. Therefore both the MI interventions led to clinically significant 5% weight loss which was maintained at 24 months which lends further support for the efficacy of MI for WLM.

A final study supporting MI for WLM is a RCT [25] looking at a dietary intervention that included MI which aimed to reduce fat intake. The authors indicated that after one year body weight was lower in the intervention group and a difference was maintained between groups throughout the study. At five years the women in the intervention group weighed significantly less that the control group.

Despite these positive findings there are a few studies that have not supported the use of MI in WLM. A RCT conducted by Hillsdon et al (2002) [85] examined the effect of two different interventions on physical activity. Self-reported physical activity was assessed from the logbook and was calculated as kilocalories per kilogram bodyweight per week, therefore this study is about increasing positive behaviour. Participants were randomised to one of three arms: direct advice, brief negotiation which consisted of a brief version of MI or control. They found that there was no significant difference between direct advice and brief negotiation for BMI at follow up. They did however find a significant difference between the control group and the brief negotiation group when looking at increases in physical activity. This intervention targeted physical activity rather than weight and the lack of effect on BMI could be because the intervention did not tackle diet as well as physical activity which has been shown to be important for maintenance [50].

In another study a MI intervention was used to help maintain reductions in cardiovascular disease risk factors [86]. The findings indicated that in obese patients,

there was a significant decrease in BMI between baseline and 6-months (p = 0.010) but no differences between baseline and 18-months. Thus there is an effect of MI on weight loss however that effect is not maintained at 18 months. A final study [87] testing a MI intervention for diabetes also suggests that MI may not be effective in supporting WLM. No statistically significant differences in weight (mean change score = 0.664, p = 0.291) or waist circumference (mean change score = 1.366, p = 0.297) were found between the intervention and control group at the 24 month follow-up. The evidence from this study indicates that that MI is not effective for maintaining weight loss, however the aim of the study was to look at the effect of MI on glycaemic control and perceived competence of diabetes self-management. Studies targeting weight loss maintenance could have more positive effects.

2.5.2.1 Summary

In summary, although evidence is limited these studies suggest that MI has the potential to assist with long-term weight loss. The quality of the MI that was delivered is however unknown for the majority of the studies. Five studies [24] [25 83-85] did not provide information on the fidelity of MI, and West et al (2007) [24] did not report how counsellors were trained. Only three of the papers [23 61 87] reported on the fidelity of MI delivered and found that their counsellors were MI proficient. Therefore with limited knowledge of the fidelity of the MI it is difficult to assess whether full MI was actually delivered and therefore the true effect of MI on long-term weight loss or WLM. There were also potential issues with the training and supervision that the MI therapist had received and some studies did not state whether this was provided at all. This in combination with the lack of fidelity testing means it is very hard to know how well the MI was delivered. There were also multiple intervention components delivered aside from MI, it hard to identify whether the changes in outcome observed are attributable to MI or other aspects of the intervention. There were also two studies [85 87] that were underpowered therefore the finding that MI does not have an effect on weight may not be reliable.

2.6 Mechanisms of change within motivational interviewing identified in the addiction literature
2.6.1 Introduction

This Section will review the evidence relating to potential mechanisms for change within MI specifically in relation to the addictions literature. The evidence in the 'health behaviour' literature will be examined in the systematic review in Chapter 3. This is key

to explore because if there is an understanding of how MI works it could help to focus MI practice and potentially improve client outcomes.

One systematic review by Apodaca et al [26] has looked at the potential mechanisms of MI in relation to addictions. This review included papers up until November 2007, therefore this Section will give a brief outline of the review's [26] findings and go on to discuss papers that have been published since.

2.6.2 Systematic review

The systematic review [26] looked at the potential mechanisms of MI in the context of addictions. They considered four constructs of therapist behaviour: MI Spirit, MI-Consistent behaviours, MI-Inconsistent behaviours, and therapist use of specific techniques. Five constructs of client behaviour were evaluated: change talk/intention, readiness to change, involvement/engagement, resistance, and the client's experience of discrepancy. They found evidence for a causal chain in which therapist behaviours affect change talk and change talk affects outcome. Overall, they identified that clients receiving MI are more likely to engage in change talk, and client change talk is predictive of better outcomes. They discovered that increased levels of MI inconsistent behaviour led to higher levels of resistance in the client and worse outcomes. Lower levels of MI inconsistent behaviour by the therapist led to better client engagement. The review indicates there is limited evidence that readiness to change is a mechanism of MI. They found that only when MI was compared to a minimal/ placebo condition was there an increase in readiness to change. However, when MI was compared to standard care or a standalone treatment as an intervention, there was no significant difference in readiness to change between MI and standard care. Overall the evidence in this review is mixed but also limited due to the lack of studies. The authors [26] conclude more research is needed as only two studies conducted full mediation analysis. There are also limitations to this review due to the lack of research in this area at the time it was conducted. This means there are a limited number of studies that examine the large number of constructs evaluated. As such, evidence related to the constructs may be affected disproportionately by the number and quality of the studies. As the study sample was too small to do so, they did not analyse the potential relationships quantitatively between effect sizes for constructs and study characteristics. There was also a lack of comparability across studies due to the differences in how MI was measured and provided as an intervention.

2.6.3 Change talk

Since the Apodaca et al review [25] which went to 2007 there have been further studies looking at the effect of change talk. Change talk is defined as statements by the client revealing consideration of, motivation for, or commitment to change. Sustain talk is any statement made by the client in favor of the status quo. Change talk can be divided in to preparatory language (desire, need, ability and reason) and mobilising change talk (commitment, activation and taking steps). Some studies have looked at the types of change talk used by the client during the MI session. Moyers et al (2009) [88] found preparatory language and mobilising change talk were important for changing behaviour. This study had a large sample size with118 sessions however the sessions were not chosen at random and therefore may be underrepresenative of the intervention as a whole. The sessions comprised a brief MI intervention with no reported fidelity check. However this study did conduct mediation analysis therefore evaluating MI mechanisms. However a recent study by Walker et al (2011) [89] examining treatment for marijuana addiction indicated only desire and reasons for change were clear predictors of drug use outcomes above and beyond pre-treatment levels and motivations for change. Therefore these findings suggest that client statements focusing on desire and reasons for change are important to elicit and focus on during a MI session. Again there are issues with this analysis; no mediation analysis was undertaken therefore it is not clear if there was an effect of MI on outcomes. They also had a small sample size so could have been underpowered to detect differences. Finally there was no fidelity check conducted so it is hard to tell whther it was actually MI being delivered. A further study [90] looked at both preparatory language and commitment language. Their results suggested that the stronger the commitment towards change the better gambling outcomes were at 12 months. In contrast to the two previous studies the expression of preparatory language and readiness for change were not predictive of outcome. Again this study conducted no fidelity check and had a very small sample size of only 40 leading to it possibly being underpowered. There was also no mediation analysis carried out to check that change talk is actually a mechanism of MI. These studies suggested that there may be specific aspects of change talk that are associated with outcomes, however more research needs to be conducted to understand which aspects these may be. The mixed results presented here could related to poor quality with some studies being underpowered and a question over fidelity delivered.

Further publications since the systematic review [26] have examined specifically the causal chain as an explanation of how MI works. The casual chain is MI consistent behaviours increasing change talk and change talk leading to an improvement in outcomes. Moyers et al (2007) [27] looked at this potential causal relationship and found that the likelihood of client change talk was higher following behaviours consistent with MI and lower following therapist behaviours that were inconsistent with MI (study one). In addition behaviours inconsistent with MI were more likely to be followed by sustain talk. In study two change talk was a significant predictor of lower average drinks per drinking day and sustain talk was a significant predictor of both a lower proportion of days abstinent and a higher average drinks per drinking day. Moyers et al (2009) [88] ascertained client change talk once initiated by therapist behaviours during the MI sessions did lead to reduced drinking. Vader et al (2010) [91] also looked at this causal chain but found different results from Moyers et al (2007 & 2009) [27 88]. They looked at MI only sessions (MIO) and MI with feedback (MIF). In the MIF session MI consistent behaviours (MICO: incorporating the following behaviours: advise with permission; affirm; emphasize control; open question; simple reflection; complex reflection; reframe; and support) predicted change talk and in the MIO session MICO predicted both change talk and counter-change talk. Only in the MIF session was there a relationship between client language and outcome. Therefore at present there is mixed evidence for this hypothesised causal chain. Again this mixed evidence could be due to the differences between studies. There is a variety in the number of sessions delivered ranging from 1 to 3 leading to a possible dose effect. Two out of the three studies [27 91] had a small sample size and consequently underpowered analyses which may explain some of the non-significant results. There were also issues with multiple comparisons which could have led to type 1 errors. Furthermore the fidelity of the MI sessions was not reported.

There have been a number of studies focusing on how the therapist can elicit change talk and looking at the therapist skills preceding change talk. One study [92] used the Motivational Interviewing Sequential Code for Observing Process Exchanges (MI-SCOPE) on 38 audio recordings of Motivational Enhancement Therapy addressing alcohol issues. The MI-SCOPE measures the therapist and client interaction, with a particular focus on the sequential information contained in the exchange. It measures the sequence between the therapist skills and the client's behaviour. This study found that MICO increased the probability of the client using change talk. MI inconsistent

behaviours (MIIN: incorporating the following behaviours: advise without permission; confront; direct; raise concern without permission, and warn. If MI is delivered well there should be a low occurrence of MI inconsistent behaviours and these should be inversely related to outcome) was more likely to be followed by counter-change talk.

Only one study [93] has examined the therapist behaviours used prior to change talk in more depth. MICO significantly positively predicted change talk, however reflective statements, reframing and raising concern without permission were also significantly positively related to change talk. Therefore it may be that more specific therapist behaviours are associated with change talk than MICO. However there are issues with these studies in that one was likely underpowered with a sample size of 38 [92]. The other study did not select included sessions at random, creating a potential source of bias. No mediation analyses were carried out so therefore it cannot be said MICO is a mechanism of MI (given there is no established link to participant outcomes). Finally fidelity was not reported.

Finally, another paper [94] has examined the within-session predictors of the client's decision to complete a change plan. Since a change plan is a way in which the client can make a plan to change their behaviour it is an aspect of change talk. The study analysed 291 sessions investigating therapist behaviours. MICO behaviours significantly predicted the decision to completing a change plan. Therefore the skills that therapists use are important for eliciting change talk from the client. Although the sample size is large in this study there are issues with the MI intervention being delivered. It uses elements of MI and is a manualised intervention so may not be a true reflection of MI. As there is no fidelity check it is hard to say whether what was delivered was MI.

2.6.4 Questions and reflections

Specific therapist behaviours have also been investigated as mechanisms of MI since the systematic review. Open questions may serve as ""door openers" to bring issues to light for clients while maintaining a collaborative process of information exchange"[95]. Tollison et al(2008)[96] identified no support for the main effects of closed or open questions on changes in drinking. A further study by Gaume et al (2010) [97] however, found that open questions were less likely to be followed by change talk and more likely to be followed by neutral talk.

Reflective listening facilitates the client's focus on his or her knowledge and resources and is another technique used by therapists. Reflections can either be simple or complex. Simple reflections usually involve repeating or rephrasing a client's statement and are often used to help the therapist understand where the client is. Complex reflections provide a more in-depth interpretation of a client's statement by re-phrasing it or looking at the meaning and emotion behind words[95]. Two studies, Gaume et al (2010) [97] and Moyers et al (2009) [88] produced similar results, indicating that reflections are strongly related to change talk. Therefore reflections may work through change talk leading to improved outcomes rather than as a mechanism operating alone.

Tollison et al (2008) [96] is the only study to report fidelity in that they report that the therapist reached proficiency before they started seeing participants. However fidelity checks were not repeated during intervention delivery. The other studies do not measure fidelity of MI. There is also variety in the number of MI sessions delivered leading to a possible dose effect. The Gaume et al (2010) [98] study, which although has a large sample size of 149 sessions, makes multiple comparisons leading to potential type 1 error.

2.6.5 Empathy

Empathy is another important therapist technique that could be a mechanism of MI however it was not included in the Apodaca et al [26] systematic review. Since the review was conducted there have been studies looking at empathy in relation to addiction outcomes. Gaume et al (2008) [99] looked at whether counsellor and patient communication characteristics predict change within brief alcohol interventions using the MISC. High empathy correlated with greater decreases in weekly alcohol use. However when empathy was included in a multiple linear regression model adjusted for age, sex, and alcohol-use severity it was no longer significantly related to drinking outcomes. A later study by Gaume et al (2009) [100] looked at the influence of counsellor skills during brief motivational interventions on patient alcohol use at 12 months follow up using the MISC. Examining empathy in relation to alcohol outcomes and perceived ability to change, the level of empathy was in the expected positive direction but failed to reach significance (p=.25). These two studies suggest that empathy may not directly affect outcome, however it cannot be ruled out as mediation analyses is needed to establish whether empathy is a mechanism.

These studies both had large samples sizes of brief MI sessions with sessions ranging from 15 to 30 minutes in length. Therefore some of these sessions are too short to for the MITI to be conducted and measure fidelity. As stated with Gaume et al (2009) [100] there was variety in the MI skills delivered. This could have affected how well empathy was conveyed during the study.

2.6.6 MI spirit

MI spirit is based on three key elements: collaboration, evoking the client's ideas about change and autonomy. A recent study [101] of MI for smokers which was not included in the Apodaca review demonstrated that MI spirit significantly predicted engagement with MI (p=< .01). However the study by Gaume et al (2009) [100] looking at therapist skills in a brief motivational intervention for reducing alcohol use found that when examining MI spirit in relation to alcohol outcomes and perceived ability to change, there was no significant relationship (p = .16). Again the Gaume et al (2009) [100] had variety in the standard the MI skills were delivered which may have led to the non-significant results.

2.6.7 Summary

Different potential mechanisms have been examined to try and shed light on how MI works with many inconsistent findings. Change talk seems to be consistently linked to improvement in outcomes. Further research into therapist behaviour, client language, mechanisms of change and behaviour change is needed to fully understand the causal pathways. The Apodaca el al (2009) systematic review [26] concluded that more mediation analysis to look at mechanisms is required, however this has not been achieved in recent research. Therefore future research must address this issue in order to further understand the mechanisms of MI. Many of the studies look at MICO and MIIN however there are many more techniques that a therapist uses during a session such as reframing and double sided reflections that have not been examined specifically in relation to change talk. Further research is also need to look at specific therapist behaviours that elicit change talk since this seems to be an important aspect of MI in relation to outcome. There are also many limitations to the studies above. There is heterogeneity between studies in terms of delivery of MI. There was a variety in the number of sessions received by participants, ranging from 1 to 3 sessions causing a potential dose effect. The training that MI therapists received also varied from no reported training to 7 days of training. This has implications for the quality of MI

delivered which is likely to have impacted on outcomes. Only one of the studies stated they measured MI fidelity to ensure participants were actually receiving MI. This could have a large impact on findings as statistically non-significant results may simply be due to MI being delivered poorly. There are issues with the studies being underpowered and potentially issues with multiple comparisons and type 1 error. There may also be limitations in the way that the therapists' skills are measured; both quantitative and qualitative approachesare likely to be most informative. The therapist-client relationship could also be a mechanism of MI and is a possible direction for future research.

2b.0 Literature review: Planning and goals

2b.1 Introduction

Planning is part of the MI process and we know from previous research that planning has an important role in behaviour change [33]. It is therefore important to understand the theory behind planning as it contributes to the knowledge of the role planning has within MI and how it could be a potential mechanism of MI. Clients have goal intentions and they are encouraged during the planning process to make plans to achieve these goals. Therefore it is important to also examine goal setting theory and draw parallels between planning theories and goal setting theory.

Planning has been defined as "a prospective self-regulatory strategy, a mental simulation of linking concrete responses to future situations. Using this strategy, the ineffective, spontaneous reactions formed in-situ are replaced by pre-planned, details of action implementation and detailed strategies for coping with anticipated obstacles" [102]. It has been found that there is a gap between people having intentions to change behaviour and actually changing their behaviour [34]. Theories such as the Theory of Planned Behaviour (TPB), the Health Action Process Approach (HAPA) and Rubicon Model of Action Phases have suggested that planning could bridge that gap. Within behaviour change research planning takes many forms such as action planning, coping planning and implementation intentions.

Goal setting theory was developed by Locke and Latham[103] and was developed over 25 years based on 400 laboratory and field studies. It was developed within industrial and organisational psychology. These planning and goal setting theories and models will be summarised below.

2b.2 Planning: theory and models
2b.2.1 Theory of planned behaviour
TPB builds upon the Theory of Reasoned Action in 1980. Behaviour can best be predicted by a person's intention to perform the behaviour. The TPB states that whether a person acts on their intentions is based upon a consideration of their attitudes towards the behaviour, the social pressures to engage in that behaviour or subjective or perceived behavioural control. The most important element in the TPB is a person's

intention, which reflects the strength of their motivation to act on their intentions. A person's intentions according to TPB are hypothesised to mediate the influence of their attitudes, subjective norms and perceived behavioural control [104]. The stronger the intention to engage in a behaviour, the more likely its performance. However intentions are not enough to predict whether a person will engage in a behaviour. Behaviours are not always under volitional control and there are circumstances where there are constraints on action. Intentions therefore can only predict behaviour if the behaviour in question is under volitional control. When this occurs perceived behavioural control can provide information about the potential constraints on action that are perceived by an individual and can explain why intentions do not always predict behaviour [105]. Perceived behaviour control is the extent to which a person considers the performance of a behaviour to be under their voluntary control and how easy or difficult it is to perform the behaviour. The TPB states that if intention is constant then the "effort expended to bring a course of behaviour to a successful conclusion is likely to increase with perceived behavioural control" [106]. Therefore as long as the extent to which perceived control is realistic, it can be used to predict the probability of a successful behavioural attempt. This theory therefore states that, the best prediction of behaviour can be gained from looking at a person's intention. This is the most proximal indicator of how much people are willing to try, and how much effort people plan to exert towards performing a particular behaviour [106]. This intention to act can be seen as a person's commitment towards change making this an important element to measure. The intention process described is a prerequisite for planning. A person needs to have the intention to change before a plan can be made as to how they are going to change.

2b.2.2 Health action process approach

HAPA has a similar structure to the TPB and can be regarded as an alternative to the TPB [107]. HAPA is a model of health behaviour which describes a process of how intentions leads to behaviours that an individual enacts. This process includes both a motivational and volitional phase. The motivational phase is like the TPB in which a person forms an intention to perform a behaviour. Therefore the person sets a goal which they would like to achieve. After the motivational process of goal setting, people enter the volitional phase, which can be subdivided into a sequence of sub-stages, including planning, initiation, maintenance, relapse management, and disengagement [108].

The motivational phase is characterised by growing risk awareness, the person's expectation of the outcome and perceived task self-efficacy that lead to the formulation of an intention. The beginning of this process is growing risk awareness. In order for a person to start to contemplate the benefits of possible actions there must be a minimal level of threat felt. This implies that the person is not happy with the status quo and is thinking about change. A person will also think about the positive and negative outcome expectancies that could come from enacting a behaviour. The more positive outcomes a person perceives, the more likely they are to change their behaviour. The process also involves self-efficacy as a person must believe in their ability to complete the desired action otherwise it will not happen. The final part of this phase is developing a goal intention, which includes the person's motivation to move toward a goal [109]. This is similar to the process of change in the TTM. The Process of change explains how people move through the stages of change. There are 10 strategies involved, five are experimental which happen earlier and five are behaviour which happen later during the stage transitions [73]. Both the motivational phase and the process of change explain how people become motivated to change.

The goal intention aspect is similar to the intention in the TPB, however in the HAPA once an intention is formed the volitional phase of the model must be enacted. This involves the behaviour being planned, initiated, and maintained, and relapses being managed. The intention must be transformed into detailed action plans of when, where, and how to perform the behaviour [108]. Planning mediates the intention-behaviour relationship, meaning that individuals with high intentions are more likely to engage in action planning, and those who plan are consequently more likely to achieve their desired behaviour [107]. When the new action has been initiated, self-regulatory cognitions to control and maintain the behaviour must be activated. This will allow new routines to develop and to be protected from old habits and situational barriers. The self-regulatory cognition will address setbacks and a person will have to have the confidence to recover from unforeseen difficulties. Therefore a person will have to possess recovery self-efficacy which reflects an individual's conviction to get back on track after being derailed [107]. This will allow the new behaviour to continue to be enacted [109].

The HAPA has clear implications for behavioural interventions. The key principle is that, in order to produce a change in a person's behaviour various different aspects of

the HAPA process must be targeted in order for the intervention to produce long-term behaviour change. For example a person's planning process must be targeted to get them to make a plan about how they will act on their intention. Their self-efficacy must also be targeted as if they do not believe in their ability to enact the behaviour and keep it on track then the behaviour change will not happen.

2b.2.3 Rubicon model of action phases

The Rubicon Model of Action Phases states that behaviour has four phases; pre-decisional, pre-actional, actional and post-actional [110]. The pre-decisional phase is characterised by deciding what the person wants to achieve. Many people have many different goals but they cannot act on them all as some may contradict each other, others are too difficult to implement, and people do not have enough time to pursue all their goals. Therefore they must deliberate over which one they prefer to pursue. They will be prioritised into which ones are the most desirable and feasible and this then has to be turned into intention. This transformation is "characterised as a resolution resulting in a feeling of determination of fulfilling the goal" [110]. The individuals therefore form goal intentions. In this model like the HAPA goal setting is the first stage before planning. The pre-actional phase is associated with planning. Planning is often needed as people find it hard to implement their intentions immediately. This could be because they are engaged in alternative activities or because the goal intention cannot be enacted until a certain event has occurred. Implementation intentions have been suggested as a useful tool to help people plan to change their intentions into action [111]. The actional phase is about acting toward goal achievement. How successful this is, is dictated by the goal intentions volitional strength. The person must try to bring the goal directed actions to a successful end whilst dealing with repeated interruptions and possible setbacks [110]. Finally in the post-actional phase the person has to evaluate what they have achieved and decide whether further action is necessary. This is done by comparing the intended outcomes with the actually achieved outcomes [111].

Planning is an important part of the Rubicon Model of Action Phases. It is the starting point to help people change their behaviour. Without this stage people cannot successfully move onto the further stages. Planning is an integral part of this theory which explains behaviour change therefore it is important to explore planning within counselling, to understand whether planning contributes to behaviour change.

2b.3 Goal setting theory

Goal setting theory was developed inductively over 4 decades based on empirical research and is based on the premise that consciousness affects goals [112]. A goal is defined as "what the individual is consciously trying to do" P2 [113]. Goals direct attention and action, as a person wishes to perform actions that are consistent with their personal values. A model of goal setting has been developed which starts with the person's values, which creates a desire to act consistently with them, leading to intentions (goals) being made. These focus a person's attention and mobilises effort which then leads to behaviour and outcomes [113].

Goals should be specific so that individuals know what they need to strive for and they can measure their own progress against this goal. Goals should also require effort to achieve, as an easy goal will not bring the desired increase in performance. Goals should be challenging but not so difficult that they are outside the capability of the individual [114]. Goals should be specific so that individuals know what they need to strive for and they can measure their own progress against this goal. Goals should also require effort to achieve, as an easy goal will not bring the desired increase in performance [113].

Goals should also be time-limited in order to improve effectiveness. This serves as a way of increasing motivation. In a occupational context, if an employee knows a deadline is approaching they will invest more effort to complete that task on time. Deadlines need to be managed so they are not too tight that the quality of work will decrease. Another aspect of goal setting that is important to improving performance is having a goal that is orientated towards learning. This allows the person to be motivated to learn new skills and master challenging situations [115]. It also helps in the work environment as employees are expected to be creative and problem solve.

One of the new directions in goal setting theory is group goals, as many people work in teams. It is therefore good to have a team goal however there is an added layer of complexity to this as there may be personal goals within the group that conflict with the group goals. As long as the goal is compatible with the group goal then performance will increase; however if it is incompatible it will harm the group's performance [114].

Another new area of goal setting theory is subconscious priming which fits with goal setting theory. Goals once activated do not need to stay in the consciousness of the person. They can remain in the periphery acting as a guide and reference point [114]. It has been found [116] that priming goals had an independent effect on task performance however conscious goals had a larger effect size. There are also unconscious goals which people persue These are personal goals that already exist in the knowledge structures in a person's memory. The goal is determined by the person history as well the opportunity to pursue that goal. Nonconscious goals are not habit or automatic but do have adaptive functions that operate via cognitive processes [117].

Goal setting theory comprises four mechanisms that may mediate the relationship between goals and performance. These are feedback, commitment, self-efficacy and task complexity [114]. Feedback helps people to determine how well they are doing in terms of their goal. It also helps them to work out which changes they need to make to ensure they stay on course to achieve their goal. Without this it is difficult to adjust the level of effort a person makes to achieve the goal [113]. Self-efficacy mediates the relationship as it influences choice of activities, effort expended, and persistence. Self-efficacy refers to perceived capabilities [114]. Self-efficacy can raise goal commitment as people with high self-efficacy are more likely than those with low self-efficacy to develop effective task strategies [118]. Self-efficacy can be increased by training or by a positive role model. A person's commitment to a goal affects the outcome as the goal performance relationship is strongest when the person is highly committed to the goal. If a goal is difficult then commitment can be important in terms of achieving the outcome. It has been found that the importance of the goal and self-efficacy can have an effect on goal commitment [112]. The final mechanism of goal setting theory is task complexity as the harder the task, the more complex the strategy that needs to be put in place. This is dependent on the person's skills and ability to develop task appropriate strategies. One factor that can help performance with complex tasks is proximal goals. It was found by Frese and Zapf (1994) [119] that distal goals were more effective than 'do your best' goals only when proximal goals was made in conjunction with distal goals. The proximal and distal goals improved both profits and self-efficacy. The proximal goals can also provide feedback and help people to adjust their behaviour to help achieve their distal goal.

Goal setting theory has both high internal and external validity as support for the theory has come from 88 different studies and more than 40,000 participants. The effects have been found at individual, group and organisational level. This theory is however evolving as new discoveries are made. Setting a goal is also a key part of planning theories. It appear to be part of achieving an outcome therefore the role goals may also plan a part in behaviour change; however goals may need to be accompanied by more specific and detailed plans to be effective.

2b.4 Plans and goals
Examining both the planning and goal setting theories there appears to be overlap in terms of the mechanisms that lead to an effect on outcome. The following elements of goal setting theory are similar to those found in the TPB, the HAPA and the Rubicon model of action phases; feedback, commitment, self-efficacy, specificity and a deadline. There is therefore an overlap between the theories that will be further explored.

Feedback is part of goal setting theory as it helps people to determine their progress and to work out if they need to make any adaptations to their behaviour to achieve their goal. Feedback is also present in the HAPA and Rubicon model of action phases. In both these models the person evaluated the progress in achieving their goal based on their plan. As part of the Rubicon model of action phases in the post-actional phase the person has to evaluate what they have achieved and decide whether further action is necessary. During the volitional phase of the HAPA the self-regulatory cognition addresses setbacks by evaluating if the person actions need to be adjusted. Although they are phrased differently there are similar principles in terms of someone assessing their progress and making adaptations to their behaviour.

Commitment is a mechanism of goal setting theory but it is also a mechanism of the TPB and the HAPA. Within the TPB the best prediction of behaviour is a person's intention. This is the most proximal indicator of how much people are willing to try, and how much effort people plan to exert towards performing a particular behaviour. Therefore a person's intention represents how committed they are to achieving a behaviour. Again commitment is also part of the HAPA as a person's intention to perform a behaviour is linked to them engaging in planning. Therefore a person's

intention is representative of their commitment which is a mechanism of both goal setting and planning theories.

Specificity and the presence of a deadline acts as facilitators of goal setting theory. Specific goals mean that a person knows exactly what they are aiming to achieve. The deadline aids as the person in knowing when they must achieve the goal by adding to the specificity of the goal. In the HAPA and the Rubicon model of action behaviour, specific plans are important to changing the behaviour. They state either implementation intentions or actions plans are part of behaviour change. They allow the person to know when they need to enact the plan and be able to identify a cue to help them enact this behaviour. The deadline in planning is the when the plan should be enacted. It identifies when the plan needs to be enacted e.g. the deadline for the plan. In both goal and planning theory specificity facilitates the attainment of outcomes.

Finally self-efficacy is a mechanism that is common to the TPB, the HAPA and goal setting theory. How confident the person is in their ability to achieve their desired outcome can affect goal acheivement. If a person believes that they do not have the ability to complete the desired action then it is unlikely to happen.

Another overlap between goal setting and planning theory is the proximal goals that form part of the goal setting theory. Proximal goals help people achieve their distal goals. They are more concrete and can be accomplished over a short period of time. These proximal goals can be seen as similar to plans. Plans also help people achieve their goals. They are also acted on in a shorter period of time that the goal which may take time to achieve. Therefore proximal goals could be similar to plans as they both facility goal achievement especially when the goal is complex. Complex goals are part of behaviour change as a goal to lose weight is complex with many possibilities of how to achieve it. Proximal goals have been stated as facilitating performance on complex tasks [112].

In summary there are overlaps between planning and goal setting theories. In terms of the mechanisms and facilitators there are similarities between the between the theories. Therefore these similarities could help people achieve their goals. As proximal goals help with complex tasks and plans help with behaviour change it may be that plans help people achieve their goals. As stated with the goal and planning theories there are also

other mechanisms that could help people achieve their goal. Although there are similarities between the theories of plans and goals, they remain separate in their definitions and their functions. The function of plans are to help and guide people to achieve their goals. Plans can be defined as the development of specific alternative behavioural paths which then helps people to achieve their goals, if goals are thought of as a desired state that a person wants to achieve, where states are outcomes, events, or processes.

2b.5 Planning and health behaviour change

2b.5.1 Planning in counselling sessions

Planning is starting to become recognised as a part of the counselling process that can help people change their behaviour. It has been stated that "action planning is typically regarded as an activity that helps in counselling to launch a client toward a new phase of self-initiated action" [120]. A paper [121] looking at the TRA and the TPB and counselling psychology recommended that these models should be taught to counselling psychologists. Counselling psychology has been involved in prevention work around risky health behaviours, like eating an unhealthy diet. This paper recommends that "training of counselling psychologists must include theoretical perspectives that inform students about models of change that go beyond the predominant individual remediation theories of counselling and psychotherapy. These models may include TRA/TPB, as well as other models that offer a strengths-based, social justice, and systems perspective on human development" [121]. This demonstrates the growing recognition of the importance of these theories to counselling psychology as it could inform practice. MI has also recently incorporated planning into its process. Planning is now the fourth fundamental process of MI. Within the MI sessions the client is encouraged to develop a specific change plan that they are willing to implement.

Studies have also looked at incorporating implementation intentions into counselling interventions. The first study [122] evaluated the effects of a brief telephone ''coaching'' intervention, which included helping diabetic patients translate broad goals into weekly implementation intentions. The results showed the coaching intervention produced significant improvement on: diet, exercise, foot care, depressive symptoms and diabetes medical symptoms. These results indicate an intervention that includes implementation intentions can have an important effect on outcomes.

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Another study [123] testing implementation intentions within counselling examined the feasibility of eliciting dietary changes in participants using a written, one-page plan, either alone or with telephone counselling. The telephone counselling condition doubled their fruit and vegetable servings (p=0.04). The telephone support was seen to have been helpful for not only assisting with the formulations of a written plan but also with support to follow up on those plans using self-monitoring.

2b.5.2 Action plans and coping plans

Action plans and coping plans are both types of plans which can help people enact their intentions and achieve their goals. Action planning is concerned with specifying when, where, and how to act [124]. Coping planning is different from action planning as it focuses on making strategies for when something stops you from completing a plan. For example individuals on a diet may make a coping plan for what they will do when they go on holiday to avoid eating lots of unhealthy food [124]. Both of these plans can have similar structures but are used for different purposes. Action plans are used to help initiate action when good opportunities occur. Coping plans are barrier focused and are based on personal experience of situations which stop people enacting plans. Coping plans are most appropriate when looking at ways in which people can maintain behaviours.

Both action plans and coping plans have been looked at within the context of behaviour change. A recent RCT [125] tested an action and coping planning intervention to promote walking. Walking was measured with pedometers and at 2 weeks after the intervention there was a significant increase in walking for the intervention group compared to the control group. Another RCT [33] testing a coping and action planning intervention for fruit and vegetable intake indicated that making action plans and coping plans significantly improved fruit and vegetable intake. They also found that action planning and coping planning mediated the process of behaviour change. It therefore appears to be helpful to combine action planning and coping planning within an intervention. Another study [126] aimed to test the predictive power of action planning and coping planning for changes in physical activity. Action planning and coping planning added 2% of independent variance for the prediction of physical activity over and above self-efficacy, intention and past behaviour. Both papers [33 126] suggests that coping planning and action planning act together to help change behaviour. This could

be because of their separate functions. Action plans help people to change their behaviour and coping plans help people to maintain their behaviour. A review of the planning literature [127] identified evidence that shows interventions that address coping planning alone, or action planning and coping planning show sustainable effects, up to 6 months, on health behaviours.

2b.5.3 Implementation intentions

Implementation intentions are another form of planning that can help people act on their intentions. Implementation intentions have a specific structure which consists of 'If situation X is encountered, then I will initiate goal-directed behaviour Y' [128].

A study [129] looking at women's walking behaviour supported the use of implementation intentions as there was a significantly higher step count over 6 weeks for the intervention group compared to the control group. A study by Chapman et al (2009) [130] aimed to compare the efficacy of separate implementation intentions instructions with a combined implementation intentions instruction on separate indices of fruit and vegetable intake. The authors reported that the combined instructions were successful in increasing fruit intake but not vegetable intake whereas the separate instructions generated a significant increase in both fruit intake and vegetable intake. The different pattern of results for fruit and vegetables provides a preliminary indication that participants do not approach the consumption of fruits and vegetables in the same way.

Forming an implementation intention also involves the selection of an effective goal-directed behaviour. In line with the theory of goal systems [131], it is assumed that for any given goal, various routes to the goal being achieved are available. This means that each component of an implementation intention can take many different forms. For example an implementation intention can specify a behaviour that can lead to goal attainment or could specify a behaviour that needs to be avoided to achieve the goal. A meta-analysis by Adriaanse et al (2011) [132] found that implementation intentions are an effective tool for promoting the inclusion of healthy food items in one's diet (Cohen's d= .51) but results for diminishing unhealthy eating patterns were less strong (Cohen's d= .29). Therefore implementation intentions are somewhat more effective in promoting healthy eating than diminishing unhealthy eating.

2b.5.4 Planning and motivational interviewing

A recent study[32] examined whether MI could increase action planning. MI had a medium sized effect on action planning (d=0.42). This study did not look at the possible effects that action planning could have on outcomes.

A RCT [31] did however examine the effects that planning had on outcomes. They examined how MI techniques could help people form action plans and coping plans and their effect on outcomes. They used three core skills of MI: empathetic listening, eliciting self-motivating statements, and responding to resistance to help the participants form plans. Adults in orthopaedic outpatient rehabilitation were randomly assigned to either an interviewer-assisted (MI techniques) or a standard-care self-administered planning intervention. Both groups had to make coping and action plans to improve their physical activity. The interviewer-assisted condition led to more complete action plans and a longer duration of physical activities up to six months after discharge. With regards to coping planning, older and middle-aged adults benefited more from interviewer-assisted planning while younger adults benefited more from self-administered planning [31]. Planning therefore appears to be an effective way of increasing physical activity especially when people are encouraged to make these plans within an MI session. How planning is elicited may depend on the age of the person but this needs to be further investigated as the intervention in this study was not full MI. Therefore it may not be MI that is helping to improve planning. Further research with a validated MI approach examining planning need to be conducted.

2b.5.5 Summary

Action planning, coping planning and implementation intentions have all been found to help bridge the gap between intention and behaviour. They have also been shown to be effective when incorporated into counselling interventions for behaviour change. People must also set goals as the first stage to behaviour change therefore it is also important to take into account goal setting when examining planning. Planning is likely be an important element of the counselling process that helps people change their behaviour.

2b.6 Conclusion

This literature review aimed to clarify and draw together published research on the topics relevant to this thesis namely weight loss/WLM, MI, mechanisms of MI within

addictions and the role that planning plays within behaviour change. This provides a background to my research. In the next Chapter mechanisms of MI within health behaviour will be explored in a systematic review.

3. Chapter 3: Mechanisms of change within motivational interviewing in relation to health behaviours outcomes: A systematic review.

The following Chapter is a systematic review examining the mechanisms of MI within health behaviours. As this thesis is investigating planning within MI and weight loss it was important to conduct a review to examine all possible mechanisms of MI in relation to health behaviours. As previously stated understanding the mechanisms of MI could have practical implications for MI delivery and gives context to planning and how it fits with the studies on other mechanisms. This review therefore demonstrates were this thesis fits in with the other research examining mechanisms of MI. This review is the first to examine mechanisms within MI that affect health behaviour outcomes and summarises and evaluates the evidence.

A systematic literature search was conducted in PSYCHINFO, MEDLINE and EMBASE to identify studies that delivered individual MI in the context of health behaviours, excluding addictions, and investigated mechanisms of MI. The search strategy included MI, motivational enhancement therapy, brief motivational intervention, mediator, therapist behaviour, empathy, client change talk, motivation, change process, obesity, diet, heart disease and hypertension. The review has also been published as a paper [133].

3.1 Introduction
Leading causes of death have changed dramatically in the last few decades, shifting from infectious diseases to non-communicable causes [134]. Cardiovascular disease is a leading cause of premature death in Europe [135]. Cardiovascular disease is strongly connected to lifestyle, tobacco use, unhealthy diet, physical inactivity, and psychosocial stress [135]. Tackling unhealthy lifestyle behaviours is therefore likely to be key in reducing cardiovascular disease. A key barrier to behaviour change is low motivation [136]. MI is a counselling approach designed to promote behaviour change. It aims to strengthen personal motivation for, and commitment to a specific goal by eliciting and exploring the person's own reasons for change within an atmosphere of acceptance and compassion [19]. There is a lack of evidence for specific mechanisms that may account for its efficacy within health behaviours [21 26] such as exercise or adhering to a medical regime. Looking at mechanisms of change (mediators) means attempting to

understand what it is that brings about change. Understanding how MI works could lead to improvements in practice and efficacy, focus research efforts and further enhance our understanding of behaviour change processes [27].

There have been at least 12 systematic reviews that have found statistically significant effects of MI in relation to health outcomes [12 14 20-22 81 82 137-141]. However, these reviews do not examine the mechanisms of MI. Potential mechanisms relate to counsellors' skills such as empathy [142 143], while others relate to client behaviour such as change talk [29 88 91]. There are potential mediators 'within the individual' for example self-efficacy and readiness to change which have also been linked to outcomes within MI (see methods for full list of mechanisms). Few systematic reviews explore mechanisms of MI. One review examining mechanisms of MI and substance abuse found the most consistent evidence pointed to change talk, clients' experience of discrepancy and therapist MI-inconsistent behaviours as being important for behaviour change [26]. Change talk is a client expression that they want to modify their behaviour or are dissatisfied with their current behaviour. MI-inconsistent behaviour is language the therapist that is not in line with the spirit of MI. The review however, investigates substance abuse outcomes and not health behaviours. Health behaviour outcomes are "behaviour patterns, actions and habits that relate to health maintenance, to health restoration and to health improvement" [144]. This includes behaviours such as exercise, diet, weight loss, managing bulimia or anorexia or adhering to a medical regime. These health behaviours may involve different mechanisms [13 139] as they require the modification or addition of a behaviour rather than the termination of a behaviour as for addictions [12 139]. However there is a possibility that the behaviours can be framed in a way that examines the termination of an aspect of their behaviour. Therefore mechanisms found to be important previously in the addictions field [26] may be different from those found to predict behaviour change in these health behaviours. To date there has not been a systematic review looking at health behaviours and mechanisms within MI.

The aim of this review is to systematically review studies identifying possible mechanisms underlying the effectiveness of MI in relation to health behaviours. It will look at mechanisms identified in the MI literature (addictions and health behaviours) to assess if the mechanisms of change in relation to health behaviours are the same or different from those in the addictions field. The review looked at the extent to which MI

is associated with a particular mechanism and whether this mechanism is related to health outcomes.

3.2 Method
3.2.1 Study eligibility criteria
The papers included within this review must examine all three of these aspects: MI, a mechanism of MI and a health outcome otherwise they will not be included.

Selected studies met the following inclusion criteria:

- Articles published from 1980 to the present.

- Participants received MI or an intervention referred to as motivational enhancement therapy (MET), motivational enhancement or a brief motivational intervention. These interventions all incorporate the techniques of MI [21]. Throughout this review the term MI incorporates these variations.

- Health behaviour outcomes for example:
    - Weight
    - BMI
    - Diet
    - Physical activity
    - Fruit and vegetable intake
    - Self-care index
    - Glycaemic control
    - Medication adherence (self-reports or pill counts)

- Qualitative or quantitative data

- MI sessions delivered to individuals and not groups (MI delivered in groups is different from MI delivered to individuals. This allowed for the MI in the studies to be more homogeneous)

- The intervention was not delivered via the internet

- Articles published in English only.

Studies were excluded if: the therapeutic intervention was to treat alcohol problems, gambling, use of illegal substances and smoking as a previous review [26] has examined mechanisms in addictions already.

3.2.2 Information sources

Research articles were identified from PSYCHINFO, MEDLINE and EMBASE. They were also identified from references of included papers and by emailing authors (identified by database searches and/or references of included papers) requesting any unpublished studies. The search included 1980 until May 2014.

3.2.3 Search strategy

A search was performed in the following three databases: MEDLINE, EMBASE and PSYCHINFO. Limits were put on the search to include only studies published since 1980 as MI was not in existence before 1980, papers published in English due to resource restrictions they could not be translated and peer-reviewed studies.

A number of MeSH were used and combined to conduct the search. The MeSH headings utilised in some of these searches are: 'Motivational Interviewing', 'Directive Counselling', 'Therapeutic process', 'Psycholinguistics', 'Therapist Characteristics', 'Physical activity', 'Health', 'Diets' and 'obesity'. As MeSH headings varied across the three databases, the same MeSH headings were not used when repeating the search in the three different databases. The MeSH heading are expansion terms therefore anything looking at health would have been included. Along with MeSH headings normal keyword searches and search truncations were performed. List of full search terms are listed below. The search terms are is three categories. The top six items in the search terms were used to identify MI studies. From seven to 25 the search terms are mechanisms and from 26 onwards are health outcomes. Each category was combined in the databases meaning an article must look at MI, a mechanism and a health outcome. For full search terms see Appendix C3-1.

3.2.4 Data collection

Identified studies were assessed by four researchers and independently checked for eligibility of the abstract and title of the records retrieved according to the inclusion and exclusion criteria. Assessment of studies was split between three researchers, and the first researcher checked all the studies. Studies that met the criteria were obtained in full text and again checked for eligibility by four researchers in the same manner and according to the criteria.

3.2.5 Data extraction

Data extraction sheets were created based on templates from the Critical Appraisals Skills Program (CASP) checklists [145]. The data extraction sheets were piloted and amended before a standard data extraction sheet was finalised (Appendix C3-2). Fifty percent of the data extraction sheets were verified for inter-rater consistency. The quality of the papers was rated by the first researcher using checklists appropriate for the study design. Due to different study designs being used different scales were used to rate the quality of the papers. RCT (Appendix C3-3) and non-controlled studies (Appendix C3-4) were checked using a checklist from the health evidence bulletins-Wales [146]. Observational and qualitative studies were rated on quality using the CASP [146] (Appendix C3-5) and NICE[147] (Appendix C3-6) checklists. Fidelity of the MI interventions was also investigated. This is important as if high quality MI is not delivered then this may impact the effectiveness of the mechanisms. Effect sizes were calculated for the different studies using follow-up means and standard deviations (SD). If follow up SDs were unavailable then baseline SDs were used. Where these were unavailable Cohen's d or odds ratio were calculated.

3.2.6 Data synthesis

Each study was summarised descriptively in terms of results, intervention type, strengths and weaknesses of the research, type of MI, intensity of MI training, whether a fidelity assessment was included, number of MI sessions delivered, the mechanism examined and the link between MI, the mechanism and the health outcome (see Appendix C3-7). A list of all mechanism included within the review and their definition is presented in Table 3. A diagram was used to depict these links, based on a diagram devised by Apodaca (2009) [26]. The mechanisms within Figure 1 were all mechanisms identified from the MI literature and behaviour change theory. The terms of the mechanisms investigated were not prescriptive; instead all mechanisms reported were included. All studies that looked at one of these links were included within this review. These relational links are potential causal pathways through which MI could work (see Figure 1). Due to the heterogeneity of the papers included in the review, it was not possible to carry out a meta-analysis and a narrative synthesis [148] was performed instead. The narrative synthesis involved summarising the results according to the links in Figure 1. The quality of the studies was also measured and taken into account. Mechanisms that had many low quality papers led to potentially weak links in Figure 2.

The strength of the evidence was based upon the mediation triangle and which link the paper examined. See results Section.

Table 3: Definitions of possible MI Mechanisms

Mechanisms	Definition
Therapist behaviours[28]	
Empathy	Empathy involves seeing the world through the client's eyes and showing that you understand them from their perspective.
MI spirit	MI spirit is based on three key elements: collaboration, evoking the client's ideas about change and autonomy.
Reflections	To repeat or rephrase what the client has said allowing deeper meaning to the communication.
Open questions	Open ended questions facilitate a client's response to questions from his or her own perspective and from the area(s) that are deemed important or relevant.
MI consistent	MI consistent is defined as incorporating the following behaviours: advise with permission; affirm; emphasize control; open question; simple reflection; complex reflection; reframe; and support.
MI inconsistent	MI inconsistent is defined as incorporating the following behaviours: advise without permission; confront; direct; raise concern without permission, and warn[91]. If MI is delivered well there should be a low occurrence of MI inconsistent behaviours and these should be inversely related to outcome.
Client behaviour [28]	
Change talk	Change talk is defined as statements by the client revealing consideration of, motivation

	for, or commitment to change. There are different categories of change and sustain talk: ability, desire, reason, need, commitment, activation and taking steps.
Sustain talk	Sustain talk is any statements made by the client in favour of the status quo.
Self-efficacy	People's beliefs about their capabilities to change aspects of their lives. Self-efficacy includes both having the skills but also the confidence. Someone may perceive that they have the ability but not have the confidence to carry out that behaviour.
Self-monitoring	Monitoring one's behaviour, e.g. via charts, diaries or self-weighing etc.
Stage of change	Health behaviour involves six stages of change: pre-contemplation, contemplation, preparation, action, maintenance, and termination[71]. The change process unfolds over time, with progress through the six stages, although frequently not in a linear manner[149].
Motivation	The process that initiates, guides, and maintains goal-oriented behaviours.
Planning	Ideas of how the client can change their behaviour, these may include how, when and where.
Therapeutic alliance	Therapeutic alliance is the relationship between the client and the therapist.
Commitment strength	Commitment strength is how committed an individual is to changing their behaviour.
Perceived behaviour of control	Perceived behaviour of control is defined as a person's perceptions of their ability to perform a certain behaviour.

Type of MI

E.g MI only or MI plus other interventions

Link 2b

Client Behaviours

E.g change talk, sustain talk and change statements, self-efficacy, planning, self monitoring, motivation, commitment strength, perceived behaviour control, stage of change, self exploration and therapeutic alliance

Link 1

Link 3b

Link 2a

Health outcomes

E.g weight loss, diet, medication adherence and exercise

Link 4a

Link 4b

Link 3a

Therapist mechanism

E.g MI consistent, MI inconsistent, MI spirit, empathy, questions, reflections, giving information and autonomy supportive

Figure 1: Diagram of potential causal links within MI. Diagram is adapted from Apodaca (2009) diagram P3 [26]

3.3 Results

3.3.1 Study characteristics

The search identified 291 papers, after duplicates were excluded and search limits applied. After screening abstracts using the inclusion and exclusion criteria, 87 papers were obtained in full text. The final number of included studies which includes unpublished studies, and studies obtained from reference lists was 37. See Figure 2.
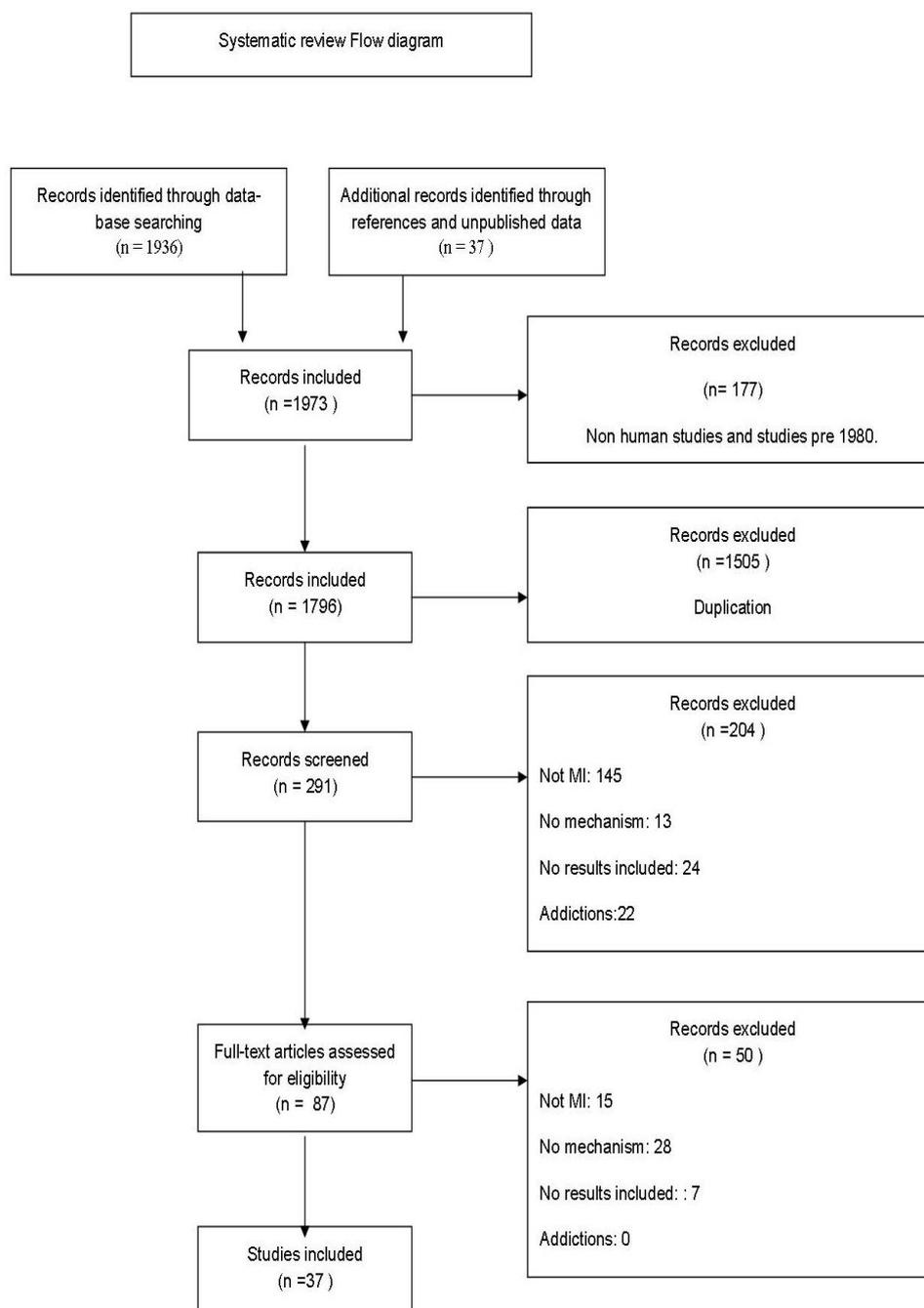
Figure 2: Flow diagram of study selection strategy.

The total numbers of participants included in this systematic review are: RCTs = 4946; Non-randomized controlled studies = 316; Non-controlled studies = 478; observational studies= 1541 and qualitative studies = 14.

3.3.2 Mechanism results
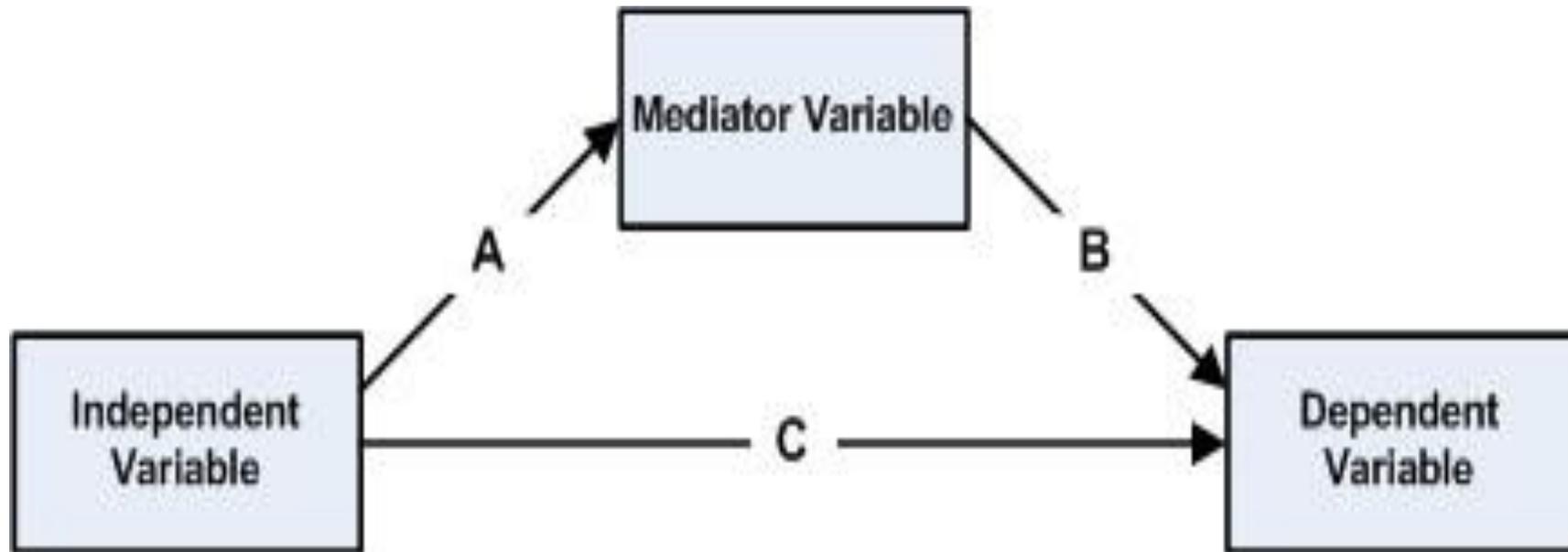
Figure 3: Mediation analysis
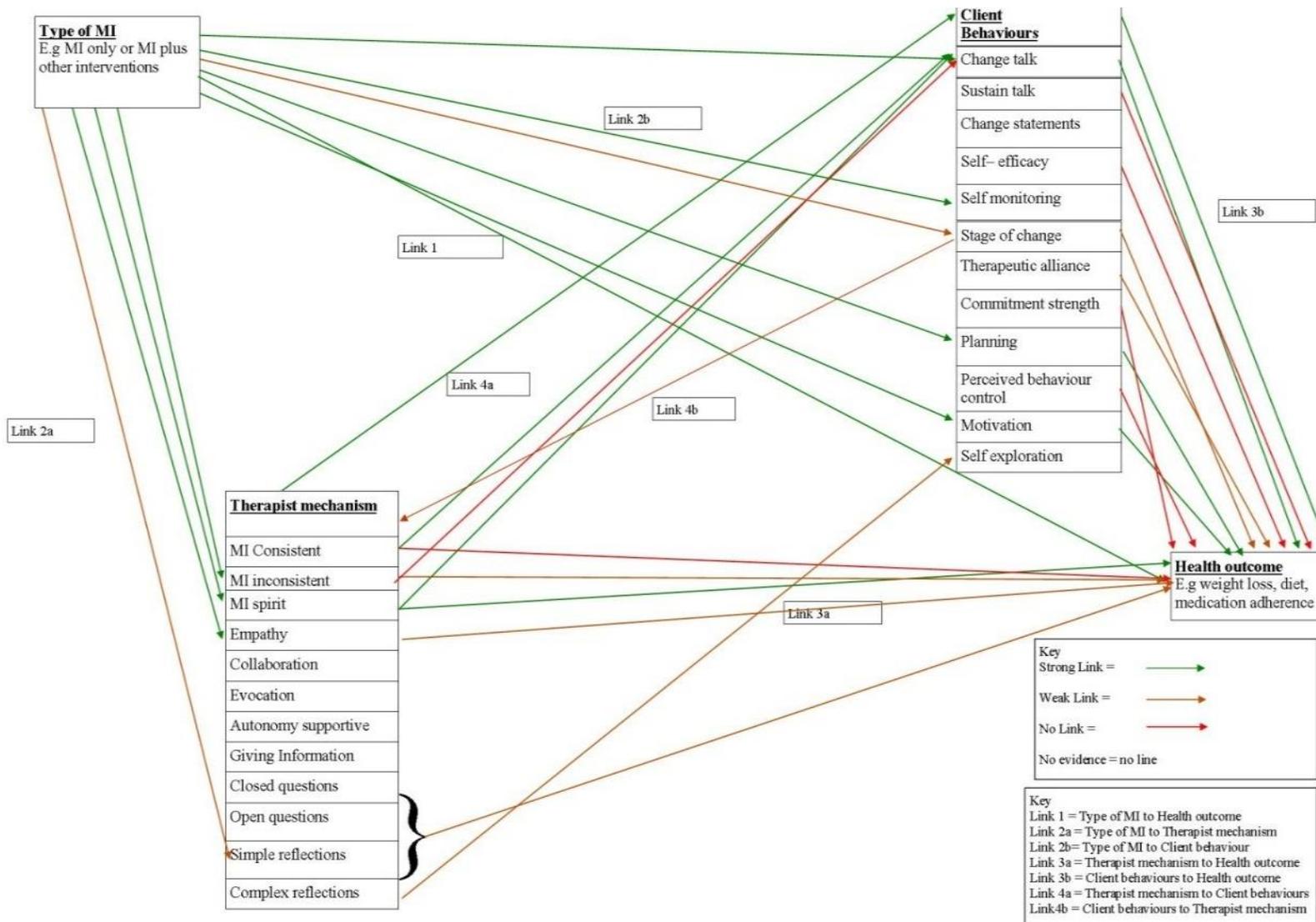
Figure 4: Results of causal links within MI

Results in Section 4.1, 4.2, 4.3 and 4.4 of this review are presented in ascending order of strength of evidence for a mechanism of MI. This is in line with the mediation triangle [150] that in order to show a mediating effect a link must be demonstrated between the intervention and the outcome (link 1), the intervention and the mechanism (link 2) and the mechanism and the outcomes (link 3). Mediation analysis is the statistical analysis used to assess if a variable is a mechanism or not. By first determining whether there an association between MI and the outcome For explanation of links refer to Figure 1 and Figure 3. Therefore this review initially examines link 1. In Sections 4.2, 4.3 and 4.4, link 2, 3 4 are examined. Link 2 is the weakest link as there is no link to health outcomes, link 4 is stronger as it investigates client behaviour outcomes, link 3 is stronger still as it examines outcomes, and finally studies looking at link 4 and 3 have the strongest level of evidence as they conduct mediation analysis.

Quality of included studies was assessed using the relevant scales according to study type. The RCTs and the qualitative study were of high quality. The non-controlled and observational studies were medium quality. A number of studies had potential issues with reliability of results, having made multiple comparisons, increasing the likelihood of type I errors.

Table 4: Quality scores of articles included in the review.

Study	Quality score
Bennett et al (2007) Motivational interviewing to increase physical activity in long-term cancer survivors: a randomized controlled trial.	10 / 11
Bennett et al (2008) A telephone-only motivational intervention to increase physical activity in rural adults: a randomized controlled trial.	10 / 11
Britt et al (2008) "Enhancing diabetes self-management: motivational enhancement therapy"- unpublished thesis.	6 / 11

Brug et al (2007) Training dieticians in basic motivational interviewing skills results in changes in their counselling style and in lower saturated fat intakes in their patients.	7 / 11
Campbell et al (2009) A randomized trial of tailoring and motivational interviewing to promote fruit and vegetable consumption for cancer prevention and control.	9 / 11
Channon et al (2007) A multicentre randomized controlled trial of motivational interviewing in teenagers with diabetes.	8 / 11
Gillham et al (2010) Impact of enhanced secondary prevention on health behaviour in patients following minor stroke and transient ischaemic attack: a randomized controlled trial.	8 / 11
Jansink et al (2013) No identifiable Hb1Ac or lifestyle change after comprehensive diabetes programme including motivational interviewing: A cluster randomised trial.	7 / 11
McDoniel et al (2010) Treating obesity with a novel hand-held device, computer software program, and Internet technology in primary care: the SMART motivational trial.	9 / 11
Seid et al (2012) The in vivo adherence intervention for at risk adolescents with asthma: report of a randomized pilot trial.	9 / 11
Shaikh et al (2011) Direct and mediated effects of two theoretically based interventions to increase consumption of fruits and vegetables in the healthy body healthy spirit trial.	8 / 11
Smith et al (1997) Motivational interviewing to improve adherence to a behavioural weight-control program for older obese women with NIDDM: a pilot study.	5 / 11
Treasure et al (1999) Engagement and outcome in the treatment of bulimia nervosa: First phase of a sequential design comparing motivation enhancement therapy and cognitive behavioural therapy.	7 / 11
West et al (2007) Motivational interviewing improves weight loss in women with type 2 diabetes.	10 / 11

Ziegelmann et al (2006) Adoption and maintenance of physical activity: Planning interventions in young, middle-aged, and older adults.	7 / 11
Olson (2008) Changing Adolescent Health Behaviors.	6 / 11
Perry et al (2007) Heart-to-Heart: promoting walking in rural women through motivational interviewing and group support.	10 / 11
Resnicow et al (2001) A motivational interviewing intervention to increase fruit and vegetable intake through Black churches: results of the Eat for Life trial.	7 / 11
Chin (2011) The impact of an obesity intervention including Motivational Interviewing on outcomes for children and adolescents.	4 / 8
Latimer-Cheung et al (2013) Developing physical activity interventions for adults with spinal cord injury. Part 2 motivational counselling and peer-mediated interventions for people intending to be active.	6 / 8
Austin (2012) The Process of MI with offenders-unpublished thesis.	4 / 8
Ernst (2007) Motivational Interviewing and health coaching: A quantitative and qualitative exploration of integration:	5 / 8
Feld et al (2001) Pre-treatment motivational enhancement therapy for eating disorders: a pilot study.	6 / 8
Neame (2012) Process of health behaviour change: Is Change Talk associated with diabetes outcome? A pilot study of Motivational Interviewing- unpublished dissertation.	5 / 8
Hardcastle et al (2012) The effectiveness of a motivational interviewing primary-care based intervention on physical activity and predictors of change in a disadvantaged community.	7 / 8
Newnham-Kanas et al (2011) Qualitative assessment of Motivational Interviewing (MI) using co-active life coaching skills as a treatment for obesity.	4 / 8

Noordam et al (2013) Motivational interviewing within the different stages of change: An analysis of practice nurse-patient consultations aimed at promoting a healthier lifestyle.	7 / 8
Perry et al (2011) Commitment strength in motivational interviewing and movement in exercise stage of change in women.	4 / 8
Pirlott et al (2012) Mechanisms of motivational interviewing in health promotion: A Bayesian mediation analysis.	5 / 8
Riegel et al (2006) A motivational counseling approach to improving heart failure self-care: mechanisms of effectiveness.	4 / 8
Riekert et al (2011) The development of a motivational interviewing intervention to promote medication adherence among inner-city, African-American adolescents with asthma.	5 / 8
Hardcastle et al (2011) "You Can't Do It on Your Own": Experiences of a motivational interviewing intervention on physical activity and dietary behaviour.	10 / 10
Pollak et al (2010) Physician communication techniques and weight loss in adults: Project CHAT.	7/ 9
Pollak et al (2009) Primary care physicians' discussions of weight-related topics with overweight and obese adolescents: Results from the Teen CHAT Pilot Study.	5 / 9
Pollak et al (2011) Physician empathy and listening: associations with patient satisfaction and autonomy.	6 / 9
Pollak et al (2007) Empathy goes a long way in weight loss discussions.	6 / 9
Cox et al (2011) Effects of counselling techniques on patients' weight-related attitudes and behaviours in a primary care clinic.	6 / 9

The fidelity of the MI interventions delivered was also examined within this review. 35% of studies stated they measured MI fidelity. Seven out of thirteen studies did not

65

report their fidelity findings, one reported proficiency and five reported findings suggesting non-proficiency. Therefore from the studies that reported their fidelity findings the majority were not delivering high quality MI according to the proficiency measures, however for the majority of the studies the quality of the MI delivered is unknown.

3.3.3 Motivational interviewing and health behaviour outcomes (link 1)

When investigating mechanisms it is important to first identify whether MI affects the health behaviour outcome/s before going on to examine the mechanism [150]. Twenty three studies investigated link 1; therefore 14 did not investigate link 1 but did investigate other links and are therefore unable to validate the mediation effect. Eleven studies reported statistically significant findings [61 151-160]. Six studies [24 161-165] reported mixed support for MI affecting health outcomes. Six papers [166-171] demonstrated that MI had no effect on link 1.

Table 5: Link 1 study results

Study	Study design	Outcome	Results	Effect size
Statistically significant results				
Shaikh et al (2011) [152] Direct and mediated effects of two theoretically based interventions to increase consumption of fruits and vegetables in the healthy body healthy spirit trial.	RCT	fruit and vegetable consumption	p=<0.01	d=0.11
Riegel (2006) [151] A motivational counselling approach to improving heart failure self-care:	Mixed methods pre-test post-test design and qualitative	heart failure self-care	12 out of 15 participants improved their self-	0.8 C.I (0.55-0.93)

66

mechanisms of effectiveness.	interviews.		care behaviour	
Treasure et al (1999) [158] Engagement and outcome in the treatment of bulimia nervosa: First phase of a sequential design comparing motivation enhancement therapy and cognitive behavioral therapy	RCT with an active control of CBT	binge eating vomiting laxative abuse	p=<0.001 p=<0.001 p=<0.05	Odds ratio 0.54 C.I (0.2-1.5) 1.6 C.I (0.6-4.2) 2.4 C.I (0.6-9.2)
Seid et al (2012) [154] The in vivo adherence intervention for at risk adolescents with asthma: report of a randomized pilot trial.	RCT	PedsQL asthma symptoms	d=0.93	-0.37
Resnicow et al (2001) [153] A motivational interviewing intervention to increase fruit and vegetable intake through Black churches: results of the Eat for Life trial.	RCT	Fruit and vegetable intake	P<0.01	-0.22
Bennett et al (2007) [155] Motivational interviewing to	RCT	Physical activity	P<0.05	0.55

increase physical activity in long-term cancer survivors: a randomized controlled trial				
Newnham-Kanas et al (2011) [156] Qualitative assessment of Motivational Interviewing (MI) using co-active life coaching skills as a treatment for obesity	Quasi experimental design	Physical activity	d=0.6	d=0.6
		Fruit and vegetable	d=1.06	d=1.06
		protein	d=1.30	d=1.30
		large decrease in sodium	d=−1.53	d=−1.53
		total calories	d=−1.50	d=−1.50
		saturated fat	d=−1.08	d=−1.08
		fibre	d=–0.51	d=–0.51
		total fat	d=–0.52	d=–0.52
		cholesterol	d=–0.39	d=–0.39
		carbohydrates	d=–0.04	d=–0.04
McDoniel et al (2010) [157] Treating obesity with a novel hand-held device, computer software program, and Internet technology in	RCT	bodyweight	p= ≤0.05	-0.12

primary care: the SMART motivational trial.				
Hardcastle et al (2012) [61] The effectiveness of a motivational interviewing primary-care based intervention on physical activity and predictors of change in a disadvantaged community.	pre and post-test trial	Physical activity	P<.001	-0.19
Channon et al (2007) [159] A multicenter randomized controlled trial of motivational interviewing in teenagers with diabetes.	RCT	A1C concentrations	P = 0.003	-0.12
Gillham et al (2010) [160] Impact of enhanced secondary prevention on health behavior in patients following minor stroke and transient ischemic attack: a randomized controlled trial.	RCT	Exercise Fruit and vegetable consumption	P = 0.007 P = 0.033	0.14 0.14

Mixed results				
West et al (2007) [24] Motivational interviewing improves weight loss in women with type 2 diabetes.	RCT	Weight loss A1C	p=0.04 p=>0.05	0.82 Data not reported to calculate effect size
Smith et al (1997) [161] Motivational interviewing to improve adherence to a behavioural weight-control program for older obese women with NIDDM: a pilot study.	RCT	glycaemic control exercise levels calorie intake weight	p=0.05 p=0.07 p=0.07 P < 0.0001	0.21 -0.42 -0.46 -0.16
Feld et al (2001) [162] Pretreatment motivational enhancement therapy for eating disorders: a pilot study.	pre and post-test trial	Depression Self esteem Eating disorder symptomology	p=0.01 p=0.0001 p=>0.05	0.56 0.80 Data not reported to calculate effect size
Olson et al (2008) [172] Changing Adolescent Health Behaviors.	pre, post-test control trial	physical activity fruit and vegetables sweetened beverages screen time	p=0.006 p=0.386 p=0.059 p=0.414	d=0.4 d=0.13 d=-0.28 d=0.11

Campbell et al (2009) [164] A randomized trial of tailoring and motivational interviewing to promote fruit and vegetable consumption for cancer prevention and control.	RCT	Block food frequency question (FFQ) 35 item measure	p=<0.01	0.02
		Block food frequency question (FFQ) 2 item measure	p=>0.05	0.22
		Physical activity		
			p=>0.05	Data not reported to calculate effect size
Brug et al (2007) [165] Training dieticians in basic motivational interviewing skills results in changes in their counseling style and in lower saturated fat intakes in their patients.	RCT	Saturated fat score	p=0.00	-0.24
		Vegetable intake	p=0.46	0.05
		Fruit intake	p=0.03	0.04
		BMI	p=0.00	0.09
		Waist circumference	p=0.00	-0.04
		HBA1C	p=0.00	0.10

Statistically non-significant results				
Bennett et al (2008) [166] A telephone-only motivational intervention to increase physical	RCT	Physical activity	p = .572	0.16

activity in rural adults: a randomized controlled trial.				
Riekert et al (2011) [167] The development of a motivational interviewing intervention to promote medication adherence among inner-city, African-American adolescents with asthma	pre-test post-test trial	asthma medication adherence caregiver asthma medication adherence teen	p=0.14 p=0.96	0.03 -0.18
Perry et al (2007) [173] Heart-to-Heart: promoting walking in rural women through motivational interviewing and group support.	RCT	Physical Activity	p=0.057	0.21
Britt (2008) [169] "enhancing diabetes self-management: motivational enhancement therapy"	Two quasi-experimental designs. MET vs. usual care but patients not randomized	HB1AC	p=>0.05	d=1.0
Chin (2011) [170] The impact of an obesity intervention including Motivational	Mixed methods. Classic experimental design and	Physical activity	p=>0.05	0.36

Interviewing on outcomes for children and adolescents.	content analysis			
Jansink et al (2013) [171] No identifiable Hb1Ac or lifestyle change after a comprehensive diabetes programme including motivational interviewing: A cluster randomized trial	RCT	Hb1Ac	p=0.221	-0.058
		Fat	p=0.708	-0.026
		Vegetables	p=0.518	0
		Fruit	p=0.884	0.043
		Physical activity	p=0.839	0.030
		BMI	p=0.198	-0.035

3.3.4 Therapist behaviours

3.3.4.1 Empathy

The association between empathy and health outcomes (link3a) has mixed results [142 143 151 174-176]. In five of these six studies, practitioners did not receive any formal MI training, therefore we cannot definitively conclude MI was actually delivered. Likely due to a lack of MI training, scores on the Motivational Interviewing Integrity Scale (MITI) for empathy were very low, with many scoring one or less on a on a 1-5 scale. It is plausible therefore that formal MI training would have improved empathy scores, possibly strengthening relationships found. Three studies support this hypothesis as there was an association between MI training and empathy (link 2a) and MI (p=<.001[177] and p=0.01[165]) [165 177 178]. As stated link3a has mixed results [142 143 151 174-176]. Two studies [142 143] indicate that empathy is associated with positive health outcomes (p=0.02) [143], yet others [175 176] found no statistically significant relationship (behaviours to reduce fat intake: d=0 .13 and moderate or vigorous physical activity: d=0.00 [175], weight change p=0.26 [176]). Empathy was not related to physical activity (p=0.67) or attempted weight loss (p=0.19), but was statistically significantly related to fruit and fibre intake (p=0.05) [174]. Two studies [177 178] examined the association with either change talk or self-exploration (p=0.102

[177]) (link 4a). One study [29] (see links 4a and 3b) indicated that empathy and change talk, work in conjunction to affect outcome. Correlations were found between empathy and client change talk (r=0.40) and between change talk and fruit and vegetable intake (r=0.33, p=<0.05). However, mediation analysis was not conducted. Different pathways have been highlighted, with empathy working independently or in conjunction with change talk.

3.3.4.2 MI spirit

Again the problem with the link 3a papers is that physicians were not trained in MI, so it is not surprising that many of the therapist technique scores are low on the Motivational Interviewing integrity scales (MITI), possibly affecting the relationship with the outcome. MI training statistically significantly improved MI spirit scores (p=0.01)[165] further supporting the hypothesis. Link 3a studies [143 175 176 179] have found a statistically significant relationship between MI spirit and weight p=0.02 [176], p=0.02 [175], p=0.05[179], increased readiness to lose weight p=0.005 [126] and change in exercise patterns p=0.04 [143]. However, no statistically significant relationships were found between MI spirit and fat and fibre intake (p= 0.29), physical activity (p=0.39) and attempted weight loss (p=0.20) [174]. There appears to be no association between MI spirit and self-exploration (link4a) (p=0.310[177]) [178]. A mediation analysis [29] (link 4a and 3b) found that 'spirit' increased change talk, and change talk increased fruit and vegetable intake (CI 0.01, 0.13). It should be noted that some of the studies (see Appendix C3-7) have used the MI Treatment Integrity scale 2.0 measurement which has a different definition of MI spirit compared to version 3.0.

3.3.4.3 Open questions and reflections

Link 2a studies ([165 172]) show that when an MI based training intervention was delivered it was associated with mixed results for therapist behaviour outcomes: simple reflections (p=0.01) and total reflections (p=0.01) [165] and open questions and total reflections (statistically significant at 0.05 level [169]). However statistically non-significant improvement for open (p=0.79) and closed questions (p=0.86) and complex reflections (p=0.06) was found [165]. Two link 3a studies[174 175] found no statistically significant link between reflections and open questions and various health outcomes; physical activity (open question p=0.72, reflections p=0.86 [174], p=0.17 [175]), fat and fibre intake (open question p=0.37, reflections p=0.34 [174]. p=0.05 [175]) and screen time (p=0.41[175]). However, there was an association with physicians use of reflections and weight loss (p=0.03) [176]. Two link 4a studies

examined complex reflections [142 177] both of which found a relationship between complex reflections and autonomy support [142] (p=0.006) or self-exploration [177] (p=0.003).

3.3.4.4 MI consistent

MI delivered by dieticians who were trained in an MI intervention, did not demonstrate more MI consistent behaviour/s than control dieticians [165] (p=0.75) at 1 and 6 months post training (link 2a). Three studies investigating link 3a found statistically non-significant results: physical activity (p=0.6) [175], attempt to lose weight (p=0.08) [179] and weight loss [176]. Cox (2011) [174] found mixed results as both fat and fibre (p=0.52) and attempted weight loss (p=0.86) proved to be statistically non-significant, however there was an increase in physical activity (p=0.03). Ernst (2007) [177] found that MI consistent behaviour, did not lead to an increase in self-exploration (p= 0.728).

There is however some evidence that MI consistent behaviours might mediate outcomes along with change talk. Link 4a suggested that high levels of MI consistent behaviours, led to more change talk [178]. A study [29] exploring link 4a and 3b and conducted a mediation analysis found the effect of MI consistent behaviour on fruit and vegetable intake is mediated through change talk (CI 0.02, 0.12).

3.3.4.5 MI inconsistent

A link 2a study [165] demonstrated that participants given an MI intervention received less MI inconsistent behaviours than those in the control group (p=0.01). With link 3a, one study found that participants gained 0.3kg (not statistically significant) when physicians only used MI inconsistent behaviours [175]. There is little evidence to support the association between MI inconsistent behaviours and self-exploration (p=0.235 [177]) and no difference in sustain talk between high MI consistent groups compared to high MI inconsistent groups [178]. Investigating both link 4a and 3b [29] no statistically significant links between either mechanism (MI inconsistent and sustain talk d=0.03, MI inconsistent and fruit and vegetable intake d=0.28) and the fruit and vegetable intake outcome were found.

3.3.5 Client behaviour

3.3.5.1 Change talk and sustain talk
As previously mentioned change talk does appear to mediate the link between therapist behaviours and outcome [29]. When investigating sustain talk in link 4a and 3b there is little evidence of mediation [29 178]. Instances of change talk as a single mechanism has been investigated in two studies (p=0.01) [165] and [177]. Exploring link 3b, one study [180] found participants who changed their behaviour engaged in a greater frequency of commitment talk (p=<0.05). There was no difference between any of the other talk categories which may indicate that only one element of change talk, commitment talk, is related to outcome.

3.3.5.2 Self-efficacy
Thirteen studies [32 61 152 153 155-157 159 164 166-168 179] examining self-efficacy were identified. Two [156 166] found self-efficacy was improved by a MI intervention (p=0.019) [49]. One study[32] demonstrated mixed evidence for link 2b as they found a medium to large effect size increase in goal setting self-efficacy(d=0.72). However they also found that MI was associated with decreased scheduling self-efficacy (d=-0.23) and barrier self-efficacy (d=-0.13). A study [155] investigating link 3b also found that it was statistically significantly associated with physical activity (p=0.05).

Ten studies found no statistically significant effect for self-efficacy in relation to outcome. Three studies [159 167 179] (link 2b) found no statistically significant improvement in self-efficacy (manage asthma attacks: p=0.09 and prevent asthma attacks: p=0.24 [167] and manage diabetes p=0.43 [159]). Four studies [61 153 157 168] (link 3b) found no statistically significant relationship between self-efficacy and outcomes (physical activity d=0.13 [61], weight p=0.68 [157], exercise p=0.81 [168]). These studies indicate that self-efficacy is unlikely to be a mechanism by which MI works. This conclusion is strengthened by other studies [152 153 164 166] that have examined self-efficacy as a mediator using mediation analysis. These studies all compared MI to a control and found self-efficacy did not mediate MI when looking at health outcomes (p=0.953 [166]).

3.3.5.3 Self-monitoring
This review identified only four papers looking at this all of which examined self-monitoring in link 2b, therefore, it is hard to conclude whether it works as a mechanism

of MI (submission of diaries at 6,12 and 18 months p=0.003, p=0.003, p=0.005 [24] and self-monitoring of blood glucose p=0.05 [161]). One qualitative study [181] reported that participants said they found monitoring to be useful when losing weight. A final paper [169] provides mixed support for self-monitoring as MET appeared to have contributed to increased self-monitoring of blood glucose, however, it was not generally maintained beyond the 3-month follow-up.

3.3.5.3 Stage of change

Studies have shown that the stage of change model can explain behaviour change within health outcomes [72]. Two studies [169] found MI can increase participants' readiness to change (p=0.03) [167]. Treasure (1999) [158] compared MET to CBT and found, although statistically non-significant, that both pre-contemplation (p=<0.08) and contemplation (p=<0.06) scores reduced marginally over four weeks with a statistically significant increase in action scores (p=<0.01). Another RCT [171], however, found that for those receiving MI, there was no statistically significant change for readiness to change various health behaviours (fat p=0.90, vegetables p=0.23, fruit p=0.60 and physical activity p=0.563). Three studies found no change from pre to post MI measures of stage of change [143 170] with one study [160] finding a statistically non-significant difference between MI and the control group (p=0.083). Hardcastle et al (2012) [182] found a statistically significant link (link 3b) between stage of change and physical activity (p=0.05). However, Perry (2011) [173] did not (p=0.13). A link 4b study [183] found that nurse practitioners apply their MI skills on average more when patients are in the preparation stage than in the other stages (95% confidence intervals pre-contemplation (-0.21 to 0.17), contemplation (-0.02 to 0.44) and action (-0.35 to 0.06)).

3.3.5.4 Motivation

A link 2b study [162] found a statistically significant increase in motivation associated with MI (p=0.0001). Another paper [154] found a moderate to high effect size of motivation but no statistically significant difference between the MI intervention and control (r=0.67). A qualitative link 3b study [181] found participants reported that motivation was important for behaviour change. One RCT [152] found that autonomous (p=<0.01) and controlled motivation (p=<0.01) was statistically significantly related to an increase in fruit and vegetable intake. Although no studies identified directly examined motivation as a mediator via mediation analysis, there is some evidence it could potentially be a process by which MI works.

3.3.5.4 Planning

Planning is a recently added stage to the MI process [19]. Two studies examining planning as a mechanism are included. The first study [32] looked at link 2b and found that MI had a medium sized effect on action planning (when, where, and how [31]) (d=0.42). A further study [31] found an MI intervention led to the generation of more complete action plans than the self-administered planning sheet group. Action planning statistically significantly predicted exercise at T3 (2 weeks follow up) (d=0.30 p=<0.001), T4 (4 weeks follow up) (d=0.30 p=<0.001), and T5 (6 months follow up) (d=0.31 p=<0.001). This is a relatively small correlation but is a larger effect than the authors found for coping planning as demonstrated below (a plan to help one successful cope with situations which could stop one from achieving their goal [31]). Coping planning is comprised of compensation planning and loss based planning. Compensation planning reaches significance at T4 (d=0.13 p=<0.05) (T3 d=-0.06, T5 d=0.05), Loss based planning is initially statistically non-significant (T3 d=0.06) but becomes statistically significant by T4 (d=0.10 p=<0.05), and T5 (d=0.12 p=<0.05), increasing over time with a correlation of 0.12 at T5. It is feasible that development and implementation of a coping plan could take some time to demonstrate an effect.

3.3.6 Other mediators

Other client and therapist mediators have been examined including therapeutic alliance, commitment strength and perceived behavioural control. A paper investigating therapeutic alliance [158] at week 4 of a MET or CBT intervention found that task agreement for both the therapist and the client was statistically significantly related to reduced vomiting (p=<0.05) and binge eating (p=<0.05). Client rating of goal agreement was also related to reduced vomiting (p=<0.01) and binge eating (p=<0.05).

Two studies [61 157] examining perceived behaviour control and link 3b both found no relation to outcome (p=0.5 [157], d=0.12 [61]). Finally, one study [173] looked at the commitment strength of a participant in relation to physical activity. The authors reported a statistically significant correlation with change in exercise stage of change (P =0.04). However, when looking at a possible relationship to physical activity there were no statistically significant findings (P = 0.49). Therefore at present there are not enough studies to suggest strength of commitment as a mechanism of MI.

3.4 Discussion

This review highlights that despite statistically significant evidence that MI positively influences health outcomes, [12 14 20-22 81 82 137-141] there are few studies looking at the mechanisms of MI. This review shows that there is varying and limited evidence for the different links in the causal chain (Figure 4). The mechanisms [13 139] may be different from addictions as mentioned earlier [12 139], however from the limited number of studies exploring this issue it is hard to draw conclusions. Despite limited research in this area, there is some emerging evidence that supports a theory of how MI works, in which therapist techniques influence within-client behaviour which in turn affects outcome. The findings reported in this systematic review are similar to a review looking at mechanisms of MI in relation to addictions [26].

The link between MI and outcomes (link 1) is needed to demonstrate mediation; the review indicates that 74% of the papers support the link through at least one variable. This concurs with a recent systematic review [14], that 63% of the main outcome comparisons showed statistical significance in favour of MI. The non-significant results could be explained by the poor quality of studies and methodological issues. These limitations are further discussed in the limitations section.

Motivation and MI spirit appear to be the most promising mechanisms of MI. There are four studies investigating these mechanisms; two studies are well conducted RCTs that have found a positive relationship for link 1 and all support either link 2b or 3b. However studies conducting mediation analyses are needed. When examining MI spirit the majority of studies investigate link 3a and have found there is a statistically significant relationship. It was also found by one study, that MI spirit can increase change talk which in turn increases fruit and vegetable intake [29]. This finding is also supported by studies in the addiction field [88].

The results from the analyses of empathy, open questions, reflections and MI consistent behaviour constructs are mixed in terms of link 3a with many being statistically non-significant. However, when examining link 3b and 4 studies the results indicate that one of the possible mechanisms through which MI works is via a causal chain involving therapists' behaviours, client change talk and health outcomes which has also been reported in the addictions field [26].

There is limited evidence to support client change talk behaviour as a mechanism. One study found that only commitment talk was related to outcome [180]. This is supported by research in the addictions field which has also found that commitment talk was the only category of change talk predictive of outcome [184]. It is therefore possible that it is not change talk as a whole, but commitment talk that predicts behaviour change. This could be because DARN language is preparatory language and therefore the person is exploring reasons for change compared to commitment language which is committing to change therefore it is more likely to be related to outcomes. This could be a mediator of MI, however more research is needed before any conclusions can be drawn.

When looking at other client behaviours this review found much of the research has focused on self-efficacy, with the majority of studies finding statistically non-significant results. Four studies looking directly at self-efficacy as a mediator have not found a statistically significant relationship: therefore self-efficacy looks potentially unlikely to be a mechanism of MI. This finding is surprising given that self-efficacy has been identified as an important construct in MI [21]. The quality of the measures for self-efficacy was poor however which could explain these findings. The majority of papers [32 155-157 164 166 168] used a 5 or 6 point likert scale which can lead to ceiling effect issues for baseline measures.

3.4.1 Limitations

The main limitation of this review is the lack of studies investigating mechanisms. This is compounded by the fact that there are many different mechanisms by which MI might work, meaning there are only a few studies per mechanism (in this review on average only five per potential mechanism). There are also a limited number of studies conducting mediation analyses. Therefore the conclusions that can be drawn about each construct and its role in MI are limited.

The quality of many studies is also poor. Twenty two [29 32 143 151 153-156 158-162 166-170 173 175 177 178 180] report a sample size of 60 or less and/or are underpowered, making it difficult to draw accurate conclusions. Many health behaviour outcomes are self-reported using measures of dubious quality. Only 43% of included studies were RCTs meaning that conclusions about the association been MI and outcome within this review are weak (see Appendix C3-7). However, the RCTs and the qualitative study were of high quality. The non-controlled and observational studies

were medium quality. There are potential issues with the reliability of the results where studies made multiple comparisons, increasing the likelihood of type 1 errors. This is because if one test is performed at the 5% level, there is only a 5% chance of incorrectly rejecting the null hypothesis if the null hypothesis is true. However, if there are 100 tests run then there are five tests that will by incorrectly rejected leading to type 1 error. The quality of the measures for self-efficacy is also poor including use of invalid or poorly validated measures [32 155-157 164 166 168]. If the measures are assessing the mechanisms poorly or not at all then the results based on these need to be treated with caution.

There is also heterogeneity between studies in terms of delivery of MI. There was a wide variety in the number of sessions received by participants, ranging from 1 to 18 sessions causing a potential dose-effect. The training that MI therapists received also varied greatly from no reported training to 6 days of training and 6 months experience using MI. This has implications for the quality of MI delivered which is likely to have impacted on outcomes. Only 35% of studies stated they measured MI fidelity to ensure participants were actually receiving MI. Seven out of thirteen studies did not report their fidelity findings, one reported proficiency and five reported findings suggesting non-proficiency. This could have a large impact on findings as statistically non-significant results could be reported due to MI being delivered poorly. The different types of MI included in the review could have an impact on the results if one type of MI yields better results than others. A final limitation relating to the delivery of MI was that some studies only had one MI therapist delivering the intervention therefore it is not known if the effects on outcomes were due to MI or the particular therapist and their skills.

3.4.2 Future research directions

There is a need for theory testing in this area to explore the different causal pathways. Potential theories need to be rigorously tested through mediation analysis with adequate sample sizes in order to test their predictive validity. Studies should also explicitly test a theoretically-based causal chain within the MI process that has been hypothesised before data is collected. This will reduce the number of associations tested and decrease type 1 error. As there are many possible mechanisms by which MI could work it may be that there are interaction effects occurring and not just one mechanism acting to change behaviour. Therefore future research should investigate the interaction of multiple mechanisms and their effect on behaviour.

A more standardised approach would ensure good quality research in this field. Future studies should include a control group, should always test link 1, should assess the fidelity of the MI and therapists should also receive adequate training. Finally the majority of the studies examining mechanisms were quantitative studies, it is likely that qualitative studies could add further to this research area by adding depth to our understanding of mechanisms. Fidelity measurements rely on coding schemes which are somewhat limited as they do not measure all the therapist behaviours that a therapist could possibly demonstrate. Further research using approaches like discourse analysis may enhance our understanding of the conversational dynamics of MI as this could capture further therapist behaviours and conversation exchanges.

3.4.3 Practice implications

At the outset we wished to identify the mechanisms of MI which therapists could potentially focus on in order to improve outcomes with their clients. However the quality and lack of research evidence makes it difficult to draw firm practice implications. However MI spirit seems to play an important role within MI and this should be used to evoke change talk which is linked to outcomes. Therefore research needs to be completed to enhance our understanding of the components of MI spirit to improve training and delivery. This review also has implications for researchers, as the quality of studies in this area requires improvement and further studies looking at the interactions of mechanisms are needed.

3.4.4 Conclusions

This review indicates a possible pathway by which MI could influence health behaviour outcomes which is in line with that already outlined in the addictions field [88]. It involves a causal chain whereby therapist behaviours (specifically MI spirit) positively influence client change talk and change talk is linked to improvements in health outcomes. The results also indicate that planning could also be a potential mechanism of MI, however as it is a new phase of MI there have been few studies examining this. As previously stated in Chapter 2 behaviour change theories have indicated that planning could help change people's behaviours, therefore, it is a potential mechanism of MI that should be further investigated. However this review has highlighted that more high quality research is needed to look at other potential mechanisms, interactions between mechanisms and to test this theory further.

This review gives a background to the mechanisms of MI and indicates that planning needs further research due to such little research conducted in this field. It has also been shown to be promising in the behaviour change field. As this is a novel area in MI it requires further research which this thesis will address. Therefore in the following Chapters the planning is examined as a potential mechanism of MI in relation to WLM outcomes.

4. Chapter 4: Phase 1-The development of the planning talk coding system

4.1 Introduction

The aim of this phase of the Thesis is to define planning talk and develop a coding system to measure planning talk within an MI session. In this Chapter the rationale behind the development of the planning talk coding system is outlined. It describes the data used for the development of the planning talk coding system and for the application of the coding system. The methods used in each stage to develop the coding system and test the reliability are discussed. Finally, the results from these stages in the development of the coding system are presented. This Chapter will use the first person to describe the development of the coding system to differentiate myself from the focused discussion group that were involved in the development of the coding system.

There were three stages in the development of the planning talk coding system; Stage 1 involved defining planning via expert opinion and review of the relevant literature. Stage 2 involved identifying different types of planning talk from the recorded counselling session data. A coding system was then developed from the identified types of planning talk. In Stage 3 the reliability of the coding system was tested. An overview of the development process can be seen in Figure 5.

4.2 Rationale

After immersing myself in the MI session data by listening to the audio recordings and reading through transcribed sessions, planning emerged as an important theme that was covered within the sessions. Clients were also setting goals in relation to their WLM. As already stated in the introduction and literature review Chapters there is a research gap within MI in terms of planning, therefore I wanted to measure planning within the MI sessions and relate it to the WLM outcome. These Chapters have also mentioned that planning could bridge the gap between goal intention and outcome. Therefore it was important to test whether compared to goal setting planning can improve outcome. Initially I explored whether it might be possible to code planning talk and goal setting using an existing measure. There have been a number of tools developed to measure change talk and I was interested to test whether they could be used to measure planning talk and goal setting or whether it was a separate category of client language that has not yet been measured. The tools I assessed were the Motivational Interviewing Treatment Integrity (MITI) [28], the Motivational Interview Skills Code (MISC) [185], the Sequence Code for Observing Process Exchanges (SCOPE) [186] and the Client

Language Easy Rating (CLEAR) [187]. I also looked at other counselling methods for coding systems that coded planning talk but did not find a coding system. After gaining an understanding of the different coding tools and consulting with Professor Theresa Moyers, an expert in the field, I felt these existing measures were not likely to capture planning talk or goal setting. Therefore a measurement tool to code planning talk and goal setting within MI sessions was needed in order to relate it to WLM outcomes.

4.3 Data

There are many ways to generate qualitative data including participant and non-participant observation, case studies, interviews and focus groups [188]. The method chosen is dependent on the question being asked, and the nature of the potential data. For this study it was decided that non-participant observation was the most appropriate method. It was selected to allow direct observation of the mechanisms of MI without influencing the MI session in any way. Non-participant observation is also more associated with quantitative research in which the observations are used to count and analyse behavioural phenomena [189]. Since one of the key aims of the study was to relate the qualitative data to the quantitative data through behaviour counts this method was considered an appropriate way to gather data. As I wanted to explore what happens within an MI session it was less appropriate to use interviews or focus groups as this would rely on participant or MI practitioner recall which could be subject to bias and would not record directly what was actually happening within the MI session.

There are methodological advantages of non-participant observation. Non-participant observation is defined as the researcher observing a situation to gain an understanding of the phenomenon. The researcher does not participant in the activity, they just observe. It focusses on empirical, observable detail and making sense of the participant's world and is based on what can be observed rather than on making assumptions about how things are utilised [189]. This research therefore used the non-participant observation approach to gather audio recorded data of MI sessions.

The data used in the MIMIC study to develop the planning talk coding system were the audio recordings of the MI face-to-face sessions from the WILMA study (see Chapter 1). The MI session included "hot topics" which were aspects that according to research evidence may be important to weight loss maintenance. The hot topics were to be used flexibly within the MI sessions. The hot topics included goal setting,

implementation intentions (specific plans), habits, emotional eating, self-esteem, self-monitoring and coping with relapse. The MI sessions therefore included planning and goal setting. There were also forms that the MIPs filled out at the end of each session which recorded which hot topics were used. The WILMA MI session data was considered a potentially rich source of data about planning; 1) We are interested in planning 2) We have audio transcripts of people in WILMA 3) Since these people have already made and implemented a plan to lose weight and are discussing weight maintenance, we postulated that these transcripts would have planning in them and would be a useful way to investigate planning. This data allowed in-depth exploration of 'planning talk'.

4.4 Methods
4.4.1 A mixed method approach

The mixed methods approach is defined by Bryman et al (2006) [190] as "using both qualitative and quantitative methods the research can find a more comprehensive account of the research area". Therefore both quantitative and qualitative approaches are combined in order to broaden and deepen the understanding of a particular research area. The qualitative and quantitative data should be collected and analysed in a single study or a series of studies. The two forms of data should also be combined by either merging, connecting or embedding the data. Finally the procedures for the data collection should be conducted rigorously [191]. The rationale for choosing mixed methods is that it allows the researcher to attempt to answer complex questions using the combined advantage and insights from both types of data [191]. The aim of this research is to produce results that have been rigorously tested and analysed in such a way that brings richer understanding of the data in relation to the research questions. This fits with the stance of mixed methods as it emphasises the selection and adoption of a particular design to fit the study's purpose and question whilst adding a deeper understanding of the data. A further reason for using mixed methods is that it allows the researcher to look at areas in great detail but also to zoom out and look at the big picture too [192]. This approach gives the opportunity to address questions that do not sit comfortably within a wholly qualitative or quantitative approach. As this research seeks to draw information from MI data and literature but also to apply the knowledge to test the mechanism of planning, it therefore does not sit comfortably with either a qualitative or quantitative approach. From a procedural level the study aims to bring a greater understanding of what makes planning effective in relation to weight loss

maintenance and this was informed by both qualitative and quantitative research. Mixed methods can also give a more complete understanding of the content of the planning talk measure by analysing the qualitative data; it allows the content to be informed by the plans clients make within a MI session.

The mixed methods approach has a pragmatist's philosophical stance. The epistemological stance is any way of thinking/doing that leads to pragmatic solutions that is useful. Therefore it leads to a way in which I can address the question which is informed by the approach that best answers the question. This paradigm draws on many ideas including valuing both objective and subjective knowledge. In mixed methods however the focus is on the research question rather than the method and the philosophical viewpoint. It is inclusive, pluralistic and complementary and emphasises that the researcher should take an eclectic approach to method selection. The pragmatic approach uses a logic of enquiry that includes the use of inductive, deductive and abductive techniques. Abductive techniques are those that help the person come to find the mostly likely explanation to a question. It helps to generate an hypothesis but it does not guarantee a conclusion. It emerged as a single paradigm approach in the debate surrounding the "paradigm wars" of qualitative verses quantitative [193].

Using the mixed methods approach there are three basic mixed methods designs that researchers could use to answer their question; convergent parallel method, explanatory sequential mixed methods and exploratory sequential mixed methods. There are also more advanced designs that incorporate these basic methods; embedded mixed methods, transformative mixed methods and multiphase mixed methods [191]. I will briefly explain the three basic mixed methods design.

The convergent parallel approach involves the researcher collecting both quantitative and qualitative data which provide different types of information to answer their question. These data are analysed separately. The data can be merged either side by side, using data transformation or a joint display of data in a table or graph. The interpretation of the convergent approach is normally written within the discussion and comperes the results to discover if they confirm or disconfirm each other [191].

The explanatory sequential method design consists of a two phase study. The researcher first collects and analyses the quantitative data. This data is then used to plan what the

researcher wants to examine in the qualitative (second) phase. Therefore the qualitative data will help inform in more detail the quantitative data that was initially gathered. The data from both methods are analysed separately and the quantitative data can be used to inform the sample and the questions used in the qualitative data. Again the interpretation of the results happens within the discussion with the quantitative data interpreted first and the qualitative data second [191].

The final basic method is the exploratory sequential mixed method design. This design is the reversal of the previous design as the researcher first gathers the qualitative data and analyses this to inform the quantitative data. One purpose of this design is to help develop better outcome measures and questionnaires. The measure is developed based on analyses of qualitative data and then the researcher applies the measure to a larger sample which is the quantitative aspect. The analysis of the qualitative data will lead to themes or codes emerging which can be used to develop items for the instrument. Again the interpretation of the results happens within the discussion. The qualitative results are interpreted first in order to demonstrate how the instrument was developed and then the measure is tested on a further sample to produce the quantitative data. The quantitative data is then interpreted.

In this thesis I have taken an exploratory sequential mixed methods approach. This approach was chosen since a measure for planning talk within therapy sessions does not currently exist. Therefore there was a need to qualitatively explore the MI sessions to facilitate the development of the planning talk measure prior to coding the data quantitatively. The qualitative method was conducted first as it facilitated an exploration of planning talk within the MI sessions and allowed the development of ideas about what planning looked like in MI consultations. This then led to the development of the planning talk measurement tool which summarised the planning in a MI session quantitatively, and this was then compared to the quantitative WLM data. The quantitative WLM data was collected after the qualitative phase was completed to ensure I was blinded to the result. This meant that my interpretation of the data was not influenced by the quantitative results. As stated above the exploratory sequential design was intended to improve the development of measures. Bryman et al (2006) [190] state that the "methodological goal of an instrument's development is when qualitative research is used to develop questionnaires and scale items so these can be more comprehensively based on the data". This is therefore in line with the aim of my

research, the qualitative data is giving a comprehensive insight into how the coding structure should be constructed and this in turn will give a better representation of the number of plans and their association with the WLM.

There are advantages to the exploratory design as it is a straightforward structure with two phases that are separate. It lends itself to an emergent approach as the second phase can be informed by the first phase. It is also straightforward to present as the two phases can be written one following the other so it is clear to the reader what was done at each step [194]. Finally it allows the researcher to develop a new instrument as a product of the research process [191].

There are however disadvantages to this design as it can take a long time to conduct the research. Since the second phase of analysis cannot start until the first phase has been completed enough time needs to be factored in for this. Adequate time also must be set aside for the qualitative research to be done fully and to a high standard. The researcher also has to decide who to sample in the second phase from the first phase. If this is not done rigorously it could lead to bias in the outcome [194].

4.4.1.1 Summary

I have chosen a mixed methods approach for my research as the aim was to develop an instrument to measure planning and examine whether planning within a MI session was associated with WLM outcomes. I collected both qualitative and quantitative data in order to address this research question and to gain a deeper understanding of the area. The research also follows the pragmatic paradigm which is inclusive, pluralistic and complementary and emphasises that the researcher should take an eclectic approach to method selection. It therefore allows the flexibility to use both types of data to explore the research questions.

I have used an exploratory sequential mixed methods approach. In this design the researcher first gathers the qualitative data and analyses this to inform the quantitative data. The purpose of this design is to help develop better measures and questionnaires. This therefore was the most appropriate method for my research questions. It allowed me to explore the planning with the MI session qualitatively to develop a measure of planning which is grounded in the data. This then enabled me to quantitatively look at that planning data in association with the WLM outcomes. This sequence of data

analysis also ensured that I was blinded to the WLM results while developing the instrument and coding the data. I was therefore not biased by the results.

4.4.2 Study procedures for data used in the development and application of the planning talk coding system.

As described in Chapter 1 the participants received MI counselling and were asked to consent to their session being audio recorded. From the 110 participants that received MI counselling as part of the WILMA study, 50 participants out of 57 in the trial who had at least one of their face-to-face MI sessions recorded consented to their audio recorded data being used in this study. These sessions consisted of participants who had been assigned to the intensive or less intensive arm of the main trial. Only the face-to-face MI session recordings were included in the MIMIC study. The telephone sessions are shorter and there is likely to be a different dynamic occurring in the therapist-client relationship. This different dynamic could occur due to the lack of visual cues such as body language during the telephone counselling. Body language is an important part of counselling which allows the counsellor to build upon the nonverbal relationship [195]. The telephone sessions also occurred at a later stage of the intervention and therefore were sometimes used as a check-in session rather than a formal counselling session. Therefore it was decided not to include them in the study.

The number of recordings per participant varied from 1 to 6 depending on the treatment arm the participant was in, and, whether consent for recording was given. A few MIPs did not record many sessions due to technical difficulties as well as forgetting. A decision was made to use one session per participant because 11 out of the 50 participants only had one recording. I wanted to include as many of these 50 participants as possible so I were limited to one recording per participant. The particular session for each participant was randomly chosen. This was done in order to control for any variability there could potentially be in planning talk across the different sessions. Randomisation was completed once all the participants had received their allocated number of MI face-to-face sessions and all their recordings had been sent in. The randomisation was completed using an excel spreadsheet. This was completed by listing all the participants and the sessions that had and had not been recorded and syntax was written that randomly selected a recorded session from each participant.

Once participants MI sessions had been randomised, they were transcribed, in order to conduct thematic analysis. Transcriptions were completed initially by a trained administrator working for the WILMA study and some was outsourced to an external company (25 recordings). I also transcribed 4 MI sessions as it was important for me to gain an in-depth knowledge of the data. This view is shared by other researchers who believe that transcribing one's own data allows the researcher to grow closer and more familiar with the data [196-198].

Specific transcribing guidance was followed by all transcribers (see Appendix C4-1). The MI sessions were transcribed verbatim and the transcripts anonymised as far as possible. This was done by removing any identifying information such as names and places. Confidentiality of recordings was a priority and this was ensured by all involved in transcribing.

As the administrator and the external company transcribed the majority of the recordings it was important to ensure the accuracy of the transcripts. I checked all the transcripts to ensure they were in line with the recording and had all been anonymised. This process also helped immerse me in the data.

All 50 of the MI sessions were coded using the planning talk coding tool developed in this Chapter. However some transcriptions were also used in the development of the coding system to ensure it was grounded in the data. Only the randomised and transcribed MI sessions were used in the development of the coding system therefore there was overlap between the sessions used to develop the coding system and those analysed using the coding system.

4.4.3 Definition of plans and goals

```
┌────────────────────────────────────────────────┐
│         Planning talk coding system            │          Research Activities
│           development process                  │
│                                                │
│   ┌──────────────────────────────────┐         │     Thematic analysis conducted by the focused
│   │   Definition of plans and goals  │         │     discussion group in conjunction with Litera-
│   └──────────────────────────────────┘         │     ture searching. Nine MI sessions analysed
│                                                │
│   ┌──────────────────────────────────┐         │
│   │  Identification of types of plans│         │
│   └──────────────────────────────────┘         │
│                                                │
│   ┌──────────────────────────────────┐         │     One sheet of paper technique and focused
│   │   Coding framework developed     │         │     discussion group meetings.
│   └──────────────────────────────────┘         │
│                                                │
│                                                │     Testing the coding system in the MI data.
│   ┌──────────────────────────────────┐         │     Process repeated four times with a total
│   │ Refinement of planning talk      │         │     of 20 MI sessions used to test the differ-
│   │ coding system                    │         │     ent versions of the coding system.
│   └──────────────────────────────────┘         │
│                                                │
│   ┌──────────────────────────────────┐         │     Coding system presented to group of research-
│   │   Piloting of coding system      │         │     ers who tested the coding system on one MI
│   └──────────────────────────────────┘         │     session and provided feedback.
│                                                │
│   ┌──────────────────────────────────┐         │     Planning talk coding system revised in line
│   │ Revision of planning talk        │         │     with the comments from the piloting.
│   │ coding system                    │         │
│   └──────────────────────────────────┘         │
│                                                │
│   ┌──────────────────────────────────┐         │     Planning talk coding system tested with one MI
│   │  Final version of coding system  │         │     session to produce final version.
│   └──────────────────────────────────┘         │
│                                                │
│   ┌──────────────────────────────────┐         │     Coding system taught to group of researchers
│   │ Reliability of planning talking  │         │     who then applied it to MI data. Inter-rater reli-
│   │ coding system                    │         │     ability measured. Tested on a section of a MI
│   └──────────────────────────────────┘         │     sessions and 15 examples of plans and goals
│                                                │     selected from MI data.
└────────────────────────────────────────────────┘
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Figure 5: The development of the coding system- detailed outline of how the coding system was developed at each stage.

The definition of plans and goals involved two processes that informed each other. I used an inductive approach to allow themes around planning and goals to emerge from the data but I also wanted to test ideas from existing published theory about planning and goals within the MI consultation data. The development process is outlined in Figure 5.

In conjunction with literature searching regarding planning and goal setting we used thematic analysis of the MI sessions to help develop definitions of plans and goals. A focused discussion group thematically analysed a selection of the MI sessions in order to identify plans and goals. The group consisted of researchers involved in the WILMA trial: Dr Sharon Simpson, Professor Stephen Rollnick, Dr Rachel McNamara, Dr Mark Kelson and the researcher, Lauren Copeland. The group includes two psychologists with expertise in obesity, behaviour change (SS, RM) and qualitative methods (SS), an expert in the field of MI (SR) and a statistician (MK). The group all have knowledge of MI and how MI is being used in the WILMA study to help participants maintain weight loss. They also have an understanding of the new planning process that has recently become part of MI.

Initially in order to define plans and goals I analysed five MI sessions and the group analysed two sessions from the five I analysed. This analyses identified the plans and goals occurring within the sessions. These were discussed as a group to identify the elements of the talk that made them either a plan or a goal. This was used to inform the definitions of plans and goals. As seen in Figure 5.

Informed by both the relevant literature and the MI sessions the focused discussion group used an iterative process to define plans and goals. These definitions were then tested in five further MI sessions to ensure they could be used to help identify plans and goals within MI sessions. I then tested the definitions in the data and fed back the results to the focused discussion group and any necessary changes to the definitions were made.

4.4.4 Development of the planning talk coding system

There are a number of different qualitative analysis approaches including; thematic, conversational, discourse analysis and grounded theory which could potentially be used here. The different analysis techniques were assessed as to their suitability to answer the research question. Grounded theory was decided against because I wanted to have a coding system based on evidence to ensure that it incorporated what had already been discovered about planning and goal setting. I took both an inductive and deductive thematic analytic approach to the development of the coding system (see Figure 6).

Thematic analysis involves the search for and identification of common themes that can be seen across the whole data set [199]. Thematic analysis provides a rich, detailed and complex account of the data [200]. This type of analysis meant that I could base my coding system on the planning talk that clients actually used in the MI sessions as well as the theory and ideas emerging from the review of the planning literature. Thematic analysis was used to analyse the MI sessions to identify the different types of plans that participants make. These different plans were then used to develop the planning talk coding system.

Inductive thematic analysis is used when there are no previous studies dealing with the phenomenon [201]. As previously stated in the systematic review Chapter there are only two studies looking at planning and MI [31 32]. However one study [31] only used some elements of MI such as empathy, eliciting self-motivating statements, and responding, therefore they did not provide the participants with the full version of MI. This demonstrates that there is a need for an inductive thematic approach to analysing the data, as there are no previous studies measuring free formed plans within MI. There is however research on the use of planning within other therapy settings and using planning to bridge the gap between intention and behaviour. Therefore research evidence exists that could be used to help inform the development of the coding system. A deductive approach can be used if the aim of thematic analysis is to test previous theory in a different situation [201 202]. So combining both of these approaches allowed for the coding system to be as comprehensive as possible incorporating both the MI data from this study as the primary source as well as theory and published research evidence.

Initially the focused discussion group used inductive thematic analysis of the MI data to identify different types of plans. The group listened to audio recordings of two MI sessions as well as reading transcripts in two separate meetings. I independently looked at five MI sessions between these meetings to try and identify different types of plans which was fed into the group meetings. Once the group had identified what they felt were the key types of plans emerging from the data, I searched the literature looking at the different theories and research evidence relating to planning. I compiled a summary of my findings and presented it to the group. This information was then examined in the group and applied to four different MI sessions from the previous five, to see if they were helpful and if so they were used to inform the different types of plans that would

be included in the draft coding system. This is in line with Miles and Huberman (1994) [203] as they warn against forcing data onto existing categories but do state that a "start list" allows new research to build upon previous insights in the field. I therefore tested the theories and definitions in the data to assess whether they fitted the data rather than forcing a fit. As seen in Figure 5.

The different types of plans identified by the two processes were brought together using the one sheet of paper technique (OSOP) [200 204]. This was after I reviewed nine MI sessions and the group reviewed two. An OSOP is a thematic map which is a visual presentation of themes, codes, and their relationships, involving a detailed account and description of each theme and exemplars. As one part of data analysis, Braun and Clarke (2006) [200] recommend using this technique to review themes which will help to identify coherent but distinctive themes. I used the OSOP to present the types of plans we had identified through the thematic analysis as well as the literature searching. The theories and definitions from the literature that were included in the OSOP had been already tested within the data to assess if they fitted with the planning talk occurring in the MI sessions. This approach facilitated presentation of all of the themes together which was then reviewed by the focused discussion group. The group discussed the different types of plans that had been presented and selected the definitions and types of plans that were felt best represented the plans that were occurring in the MI sessions. This was based on my knowledge of nine analysed MI sessions and the group's knowledge of two. From this the planning talk coding system was developed. As seen in Figure 5.

The coding system was then tested in the MI session data to assess how well it could be used to code the data and if it captured the nuances of planning within the sessions. I tested the coding system within a total of 20 MI sessions, different from the previous nine, and from these sessions the group tested five sessions. Any problems found were brought to the focused discussion group for further consideration. Modifications were then made to the coding system to overcome these problems and the revised coding scheme was tested in the MI session data again. Each time this occurred I tested the revised coding system with five MI sessions and the group tested it with one of these five sessions. This process was repeated four times until the coding system could be applied to the data by the focused discussion group without any issues arising. This process was guided by Boyatzis et al (1998) [205] who states that "an essential step in

the development of a useful framework for analysis is to determine the applicability of the code to the raw information" P127. As seen in Figure 5.

Finally the coding system was tested with a group of 11 independent researchers to check for any further issues that had not arisen within the team. These researchers were all PhD students and qualitative researchers. They had a variety of backgrounds such as psychology, microbiology, geography and dentistry. Three of the researchers were not familiar with qualitative coding of data. I taught the group how to use the coding system via a one hour presentation with examples. The group then tried to apply the coding system to a 3 page Section of a MI session (see Appendix C4-2). This Section of data was chosen as it contained a number of plans and goals that represented the majority of codes from the coding system. Through the piloting of the coding system I gained feedback on what the group thought of the coding system and problems they had using it. From this feedback amendments were made and a final version of the coding system was developed (see Appendix C4-3 and Figure 6).

4.4.5 Reliability testing of the coding system

Prior to the main testing of the reliability of the coding system, the training presentation (see Appendix C4-4) and coding data, were piloted with a group of nine PhD students from the Department of Primary Care and Public Health at Cardiff University. Their backgrounds included psychology, microbiology, geography and dentistry. They were trained for an hour on how to use the coding system and then applied the coding system to the test data. The test data was chosen to represent all the codes within the coding system. There were also some examples that were neither a plan or a goal to further test the coding system. They then provided feedback on how the training and materials could be improved. They suggested that the examples of plans and goals test data needed to provide context to the examples. The test transcript needed to be easier to read as the client's speech was interrupted by the therapists showing they were listening e.g "uh huh", "mmm." and "yes". I used the feedback to enhance the training and materials. This ensured that they were easy to understand and the guidance covered any areas that participants found they had problems with.

The coding system was then tested for reliability by a group of 10 researchers and administrators from the School of Medicine at Cardiff University. The participants were recruited via an email (see Appendix C4-5) that was distributed to the Institute of

Primary Care and Public Health, the South East Wales Trials Unit and the Centre for the Development and Evaluation of Complex Interventions for Public Health Improvement all within Cardiff University. The email stated that the participants would be trained how to use the coding and would apply the coding system to MI data within a two hour session. Once they had completed the coding they would receive £40 in vouchers to compensate them for their time. Twenty two people replied to the email and a representative sample of 10 was chosen. The sample was chosen by LC, SS and RM to represent the types of people who would potentially use the coding system in the future, therefore creating a representative sample. Therefore those that were decided to be included were: qualitative and non-qualitative researchers and research administrators.

The participants were initially trained for one hour to use the coding system. I provided this training though a PowerPoint presentation that went through step-by-step how the data should be coded (see Appendix C4-6). They were also provided with the coding system manual and guidelines about coding (see Appendix C4-3 and C4-7) which they could refer to whilst coding the MI session data. Transcript examples were used to explain the coding system and the participants were also given examples of transcripts to let them practice using the coding system (Appendix C4-8). They could then try out applying the coding system and ask questions before they coded the test data. The participants were then given the test data which included both a sample of an MI session (see Appendix C4-9) where they were asked to identify the plans and goals within the text and also examples of different types of plans and goal setting that were taken from different MI sessions (see Appendix C4-10). They were asked to identify the different types of plans or goal setting and also rate these on commitment and specificity. Once they had completed the coding of the data they received the vouchers to compensate them for their time.

The reliability was measured using a percentage agreement with the 'gold standard'. This gold standard had been decided upon within the focused discussion group after they independently coded the examples and then resolved any disagreements by discussion in the group. A percentage agreement was used instead of a kappa statistic to measure the reliability for a number of reasons. Kappa is based on a two by two classification table, either the raters agree or disagree. However the current planning coding system consists of rich data, containing multiple levels of codes. To test the raters agreement it was also felt that it was important to capture the location of the

rater's identified plan within the transcript. In order to use the kappa to test the reliability of the coding system the transcripts would have had to be chunked. The agreement would be measured at each chunk of text. An incremental kappa would also have to be conducted to measure the agreement of the raters for the type of plan and then at the level of specificity and commitment. This would lead to multiple complex kappa results. Due to the large areas of text where there are no plans the agreement between raters would be high leading to inflated kappa statistics. Measuring reliability using the percentage agreement approach allows a visual and intuitive interpretation of the data. The agreement is determined via agreement to a gold standard. This means that an incorrect agreement (both raters incorrectly code an occurrence that is false) does not increase the reliability statistics which can happen with kappa. Finally Kappa cannot measure the agreement for the same plan at the same location. For these reasons it was felt a percentage agreement best represented the reliability of the coding system.

4.5 Results
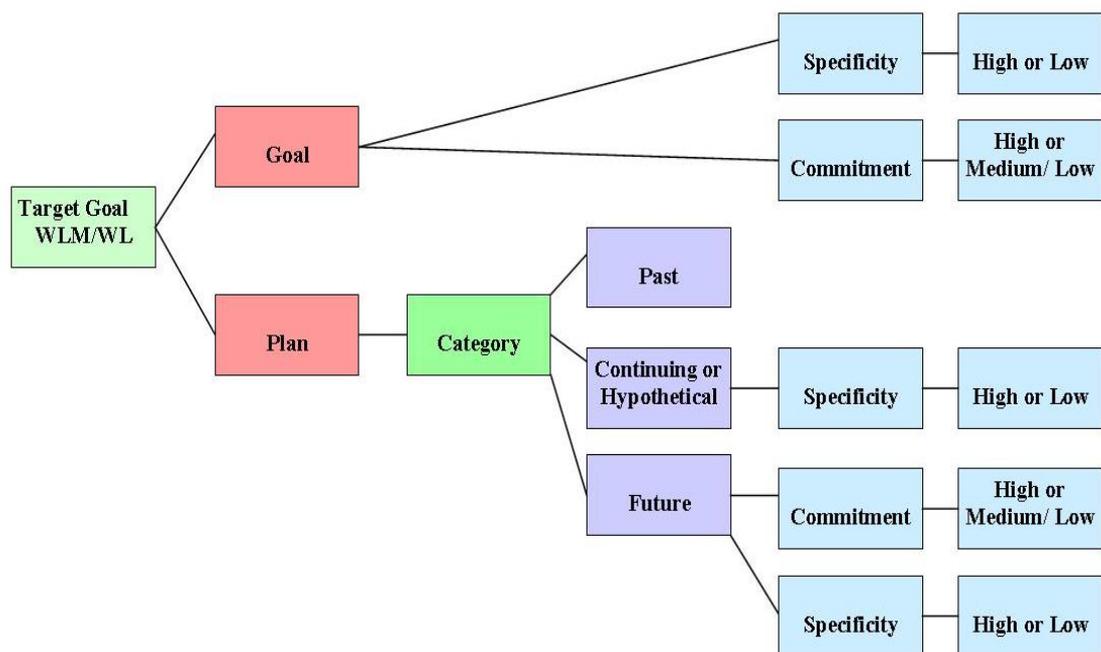
Figure 6: Coding framework for planning talk coding system

4.5.1.Definition of plans and goals

From analyses of the initial selected MI sessions the focused discussion group agreed on a working definition of a 'plan'. They decided that a plan consists of an action or set of actions to achieve a goal and there must be evidence that it is volitional. Evidence of volition applies to the past and continuing plans, as they were decided upon before the MI session, there must be evidence that the plan was a result of a conscious decision

and not something that the participant was passive to. A plan is an action or set of actions that will help the person achieve a goal. The group also decided on a definition of a goal; it is future orientated and it is something that the person wants to achieve.

When I looked at the definitions in the research literature there seemed to be no uniform definition of a plan and a goal. Many of the explanations of sub goals (a goal that helps you achieve an overall goal, e.g. weight loss) were very similar to a plan. Kirschenbaum et al (1985)[206] stated that:

"the subjectivity and relativity of the dimensions of goals and plans make it very difficult to avoid confusion in this line of inquiry" (P.490)[206].

In his paper he says that sub-goals and plans can be quite similar in their language. By collating all the definitions of goals and plans across the theories in the literature I found a definition for a plan and a goal that the focused discussion group felt was most appropriate for the MI data.

"Planning is a prospective self-regulatory strategy, a mental simulation of linking concrete responses to future situations. Using this strategy, the ineffective, spontaneous reactions formed in-situ are replaced by pre-planned, details of action implementation and detailed strategies for coping with anticipated obstacles" (P566) [102]

The definition for goals which we felt was most helpful was:

"We define goals as internal representations of desired states, where states are broadly construed as outcomes, events, or processes. Internally represented desired states range from biological set points for internal processes (e.g., body temperature) to complex cognitive depictions of desired outcomes (e.g., career success)." (P.338) [207]

Definition of plans and goals

> **The definition of a plan** agreed on and used hereafter in this thesis is that a plan is an action for the future, it is volitional, involves thought before action and contains behaviours. Planning refers to the development of specific alternative behavioural paths by which a goal can be attained[207]. People decide on a behavioural action, which is the ''how'' they will achieve the goal[124]. The "how" is the essential part of planning, the "when" and the "where" of a plan is optional for the definition of a plan, but does help to make the plan more specific. It can also involve details of actions or strategies to help the person negotiate potential obstacles[124]. If there is evidence of volition and thought before action from what the client has said then this is evidence of planning.
>
> **The definition of a goal** was agreed to be a desired state that a person wants to achieve, where states are outcomes, events, or processes[207]. This desired stated must be in the future. These desired states could range from internal processes (e.g. to be less stressed), to desired outcomes (e.g., career success). The desired states are indicated by the client using words such as "want", "aim", "desire", "aspire", "achieve" and "longing" etc. The goals will be states that the client wants to achieve that will help them reach the overall target goal which is weight loss or weight loss maintenance. The goal is therefore contingent upon the performance of actions to achieve it.

4.5.2. Development of planning talk coding system

Five different codes emerged and became part of the planning talk coding system. These were goal setting, past, continuing, future and hypothetical plans. The definitions of these codes are given below:

Goal Setting: The goal will be a state or states that the client wants to achieve that will help them reach the overall target goal. The goal is therefore contingent upon the performance of actions to achieve it. The goal does not include a statement of what the actions are to achieve it (i.e. the "How") as that defines a plan. When coding goal setting be aware that when the word "if" occurs before a goal, e.g. "If only I could be 10 stone" this is not coded as a goal. The "if" suggests that the client is wishing that they could be a certain weight rather than a goal the client thinks could be a realistic possibility.

Past Plan: These plans will consist of an expression of an action that has happened or a circumstance that previously existed. It must be a volitional plan (as described in the definition of a plan), with evidence of this being an action that has now been completed.

Continuing plan: This is a strategy to continue the same action or event at a repeated frequency either continuously or at intervals. The plan has been made before the therapy session and will continue to be enacted in the future.

Future Plan: Is a plan that will or is likely to happen in the period of time after the therapy session.

Hypothetical Plan: Is an idea about what the client could do to move towards the target goal but that the client is not committing to.

When analysing the MI data the focused discussion group observed that commitment to a plan may be important for a participant's outcome. It was felt a plan that expressed a high commitment may be more likely to be enacted and therefore positively affect the outcome. So it was agreed it was important to include a measure of commitment to the plans and goals in the coding system. This idea was supported by Amrhein (2004) [208] who stated that commitment was related to outcome and the strength of that commitment could be measured based on the client's language. A 'degree of commitment' rating was incorporated into the coding system. This resulted in future plans and goal setting being assigned a commitment rating. Commitment was defined as an intention or an obligation to complete the plan/goal made by the participant. The participant is pledging to complete a certain behavioural act. This includes starting a certain behaviour as well as stopping a behaviour, such as giving up chocolate. Hypothetical plans do not get assigned a degree of commitment as the nature of this implies the clients are not committed. Past plans initially there was an attempt to code commitment with past plans however it was decided not to assign a degree of commitment. This was due to the nature of the language identified when people talk about past plans one would not be rating the degree of commitment to the plan but rather the success or failure of the plan. A person can be very committed to a plan but unforeseen events may stop the person completing the plan counting it as a failure. Continuing plans are also not rated on commitment as the plan is continuing to happen therefore they are committed to the plan as they are enacting it. This decision was also based on the MI sessions as these plans were started by the participant and were happening therefore there is an implied commitment.

The degree of commitment a participant had for a plan was rated based on the language they used around the plan and was either rated as high or medium/low commitment. For example "I am definitely going to the gym next week" would be rated as high commitment and "I'm thinking about going to the gym next week" would be rated as medium/low commitment. The MISC 2.0 [209] gives examples of words that could express high, medium or low commitment scores and our definitions were based on these. The degree of commitment rating was dichotomised to a medium/low or high score to enable reliable coding, as the team found it difficult to differentiate between low and medium.

During the analyses of the MI sessions the group hypothesised that the specificity of the plan may affect the success of the plan and the outcome. This is reflected in the psychological literature on Implementation Intentions. Implementation intentions specify where, when and how the end state/behaviour will be achieved. They take the form of "if I encounter situation X then I will perform behaviour Y; e.g. if I arrive at work in the morning, the I will take the stairs instead of the lift" [210]. In a meta-analysis by Gollwitzer et al (2006) [128] they found that there was a medium to large effect size (d= .65) association between implementation intentions and goal achievement. Implementation intentions have also been demonstrated to be more effective when they are made specific to a behaviour change [130]. Therefore the more specific a plan is the more likely it is to be associated with outcome. This is because people then know exactly when and how they need to act in a situation to change their behaviour. It ensures that there is no ambiguity in terms of the person's actions. This was thus incorporated into the coding system. However we could not measure when, where and how as participants did not develop their plans in this way during the MI session. It was a developing process over time i.e. between sessions. Within the MI sessions the plans did vary on specificity, however they did not include the when, where and how format that implementation intentions take. The conversational style of the MI sessions did not encourage this language therefore a simplified version of 'implementation intentions' was used to rate the specificity of the plans. The coding system rates the plans on either high or low specificity. High specificity is defined as including the "when", i.e. a time scale to achieve the plan by, the time the plan will occur or it could be a cue, a state of being or a circumstance, e.g. being stressed or when they are at work. It should also include "how" they are going to achieve what they want.

All plans and goals are rated on specificity apart from past plans as the time scale to achieve them in does not apply as the plan has already been enacted.

Finally it was recognised that participants tended to repeat the same plan in different formats. The coding system was developed to gain an accurate representation of the number and type of plans a participant was making in their MI session. If the same plan is coded more than once then it would inflate the total number of plans a participant made. Therefore the decision was made that only one version of the repeated plan would be coded. This decision was also based also on the MITI 3.1 [28]. They state "Once a behaviour code is assigned once within the volley, it is not assigned again. A volley may contain only one of each behaviour code" [28]. The rule that was agreed for a repetition of a plan was as follows: if the same plan/goal is repeated but can be assigned two different codes, e.g. hypothetical plan and future plan then both plans are coded. If however, they could be assigned two codes from the same category, e.g. both assigned a future plan code then only one of these future plans is coded. The future plan that is coded is the plan that was assigned the highest commitment and specificity score. For example if a participant says "I'm thinking about going to the gym", which is a future plan with low commitment and low specificity, but later on in the session says "I'm going to go to the gym next week", which is a future plan high commitment and high specificity, then the first mention of the plan would not be coded. This means only "I'm going to go to the gym next week" would be coded. However there is an exception to this rule, if the plan/goal is retracted during the session then the plan/goal is no longer coded.

The qualitative analysis of the MI session data, literature searching and reliability testing of the coding system led to a planning talk coding system which was to be used to code the full data set in this study. A complete version of the planning talk coding system can be found in the Appendix C4-3. A final version of the coding framework can be seen in Figure 6.

4.5.3. Reliability of planning talk coding system

Investigations were conducted into the reliability of the planning talk coding system when used by researchers outside of the MIMIC study team. Ten participants took part in the testing who had a variety of research backgrounds both in qualitative and quantitative methods and subject backgrounds from English to Psychology (see Table

6). The participants applied the coding system to a Section of an MI session from the MI data. They also coded 15 examples of plans and goals that were extracts taken from various MI sessions. The reliability was calculated using a percentage agreement with the gold standard. The results can be viewed in Figures 7 and 8. The codes within these figures are explained below:

FP	Future plan
CP	Continuing plan
HP	Hypothetical plan
PP	Past plan
GS	Goal setting
HC	High commitment
LC	Low commitment
HS	High specificity
LS	Low specificity
NC	Not coded
Green	Agreement between coders
Red	Disagreement between coders

Table 6: Demographic data of participants in the reliability study

Participant	Job title	Subject background	Type of research methods worked with
P1	Receptionist/clerical assistant	BA in English and Philosophy	Quantitative
P2	Research Assistant	BSc Psychology, MSc Neuropsychology	Quantitative, qualitative and qualitative coding of problem-solving transcripts
P3	Data Manager / Research Assistant	BA Social Sciences / Psychology	Clinical trials
P4	PA to the Directors	BA in English Language and Communication	Thematic qualitative data analysis
P5	Research Associate	Psychology	Quantitative and Qualitative
P6	Data Manager	Masters in English Literature and trained midwife	Applied coding frameworks to trial data.
P7	PhD student	BSc Applied Psychology, MSc Social Science Research Methods (Sociology)	Quantitative and Qualitative
P8	Research Fellow	Social Policy	Qualitative methods including interviews, focus groups, ethnography and documentary analysis.
P9	Research Assistant	MSc in Health Psychology	Mixed methods
P10	Research Officer	BA Modern History / Politics, with postgraduate legal qualifications	Systematic reviews on topic of child protection and quantitative research into health services delivery (cancer genetics).

Figure 7 — Examples of plans and goals (each example has three sub-columns: G/P, C, S)

Examples 1–8

participant	e1 G/P	e1 C	e1 S	e2 G/P	e2 C	e2 S	e3 G/P	e3 C	e3 S	e4 G/P	e4 C	e4 S	e5 G/P	e5 C	e5 S	e6 G/P	e6 C	e6 S	e7 G/P	e7 C	e7 S	e8 G/P	e8 C	e8 S
Gold standard	FP	H	H	PP			CP		H	NP			CP		L	CP		H	G	H	L	G	L	L
P1	FP	H	H	PP			CP		H	NP			PP		CP	CP		H	G	H	L	G	L	L
P2	FP	H	H	PP			CP		H	NP			CP		L	CP		H	G	H	L	G	L	L
P3	FP	L	H	PP			CP		H	NP			CP		L	CP		H	G	H	L	NP		
P4	FP	H	H	PP			CP		H	NP			CP		L	CP		H	G	H	L	NP		
P5	FP	H	L	PP			CP		H	NP			CP	H	L	CP		H	G	H	H	FP	L	H
P6	FP	H	H	PP			CP		H	NP			CP		L	CP		H	G	H	L	G	L	L
P7	FP	L	H	PP			CP		H	NP			CP		L	CP		H	G	H	H	NP		
P8	FP	H	L	PP			CP		H	NP			CP		L	CP		H	G	H	L	G	L	L
P9	FP	H	H	PP			CP		H	NP			CP		L	CP		H	G	L	L	NP		
P10	HP		H	PP			CP		H	NP			PP		CP	CP		H	G	L	L	G	L	L

Examples 9–15

participant	e9 G/P	e9 C	e9 S	e10 G/P	e10 C	e10 S	e11 G/P	e11 C	e11 S	e12 G/P	e12 C	e12 S	e13 G/P	e13 C	e13 S	e14 G/P	e14 C	e14 S	e15 G/P	e15 C	e15 S
Gold standard	G	H	L	HP		H	NP			FP	L	H	CP		H	G	L	L	G	H	L
P1	G	H	L	HP		H	NP			FP	L	H	CP		H	G	L	L	G	H	L
P2	G	H	L	HP		H	NP			FP	L	H	CP	L		G	L	L	G	H	L
P3	G	H	L	HP		H	HP		L	FP	L	H	CP		H	G	L	L	G	H	L
P4	NP			HP		H	FP	L	L	FP	L	L	CP	FP	H	G	L	L	G	H	L
P5	G	H	L	FP	L	H	FP	L	L	FP	H	H	CP	FP	H	G	L	L	NP		
P6	G	H	L	HP		H	NP			FP	L	H	CP		H	G	L	L	G	H	L
P7	G	L	H	HP		H	NP			FP	L	L	L	G		G	L	H	G	H	L
P8	G	H	L	HP		H	NP			FP	L	H	CP	H		G	H	L	G	H	H
P9	NP			HP		H	NP			FP	L	L	CP		H	G	L	L	G	H	L
P10	G	H	L	FP	L	H	NP			FP	L	H	CP		H	G	L	L	G	H	H

Figure 7: Examples of plans and goals

Participant	line 1-4	line 5-10	line 13-18	line 19-20	line 21-22	line 21-22	line 23-24	line 25-28	line 50-51	line 52-54	additional
Gold standard	plan	plan	plan	plan	plan	plan	plan	plan	plan	goal	
P1	plan	plan	plan	plan	plan	NC	plan	plan	plan	goal	line 67-70 goal
P2	plan	plan	plan	plan	plan	plan	plan	plan	plan	goal	line35-36 goal line 49-50 goal line 62 goal line 70 goal
P3	goal	plan	plan	plan	NC	NC	plan	NC	plan	goal	
P4	plan	plan	plan	goal	goal	NC	plan	plan	plan	NC	
P5	plan	plan	plan	plan	NC	plan	plan	plan	plan	goal	line 1 goal line 42-44 plan line 70 goal
P6	plan	NC	plan	plan	NC	NC	plan	NC	plan	goal	
P7	plan	NC	plan	NC	plan	NC	plan	plan	plan	goal	line 67 goal
P8	plan	plan	plan	plan	plan	NC	plan	plan	plan	goal	line 1 goal line 44-47 plan line 70 plan
P9	plan	plan	plan	plan	NC	NC	plan	plan	plan	goal	
p10	plan	plan	plan	goal	goal	goal	plan	plan	plan	goal	

Figure 8: Transcript.

Figures 7 and 8 depict the results from the reliability testing, the green colour indicates agreement with the gold standard and the red indicates disagreement with the gold standard. For Figures 7 and 8 each participant is labelled down the left hand side and each example is listed across the top. Each participants result is listed under the example and if green, is in agreement with the gold standard and if it is red it disagrees with the gold standard. The percentage agreement for the examples of plans and goals was calculated as 86% agreement with the gold standard. The percentage agreement for the coding of the transcript was calculated as 75% agreement with the gold standard.

This shows that the planning talk coding system displays a consistently good level of reliability between the 10 different raters and the gold standard. It also demonstrates that the coding system can be taught within a 2 hour period to a group of researchers who can then reliably apply the coding system to session data.

4.6 Conclusions

We set out to define plans and goals, develop the planning talk coding system and test its reliability. To date there is no measure of planning that has been developed to code plans within MI sessions or any other counselling sessions. This new coding system, shows potential as a measure for coding planning talk.

The foundation for the coding system was the definitions of plans and goals which was based on the literature and informed by thematic analyses of MI sessions. In order to be able to code data using the coding system it needed to be clear how to identify a plan or a goal before classifying them under the coding framework. Thematic analysis of four MI sessions by the student and two MI sessions by the focused discussion group was conducted to analyse the language used by the participants when they talked about a goal and a plan. This understanding was then also informed by the literature in order to devise a working definition of plans and goals.

The types of plans included in the coding system were based on an inductive and deductive approach. The inductive approach allowed themes around planning to emerge from the data. The deductive approach allowed the testing of ideas from existing theory about planning and goals within the MI consultation data. Findings from both these approaches were combined on the OSOP which allowed a review of the results. The focused discussion group used the OSOP to choose the most appropriate types of plans

for the coding system based on the combined knowledge of nine MI sessions. The coding system was tested within the data and amendments made. This process occurred four times and led to the coding system being tested with 20 MI sessions. In order for the coding system to be applied consistently the planning process had to be simplified. It was important it was applied consistently otherwise the coding of each MI session would not be the same and would affect the results. If it was developed using grounded theory it would have explored the complex process of planning but it would not have allowed the data to be related to the outcome data in a consistent way.

The reliability of the coding system was tested by a group of researchers. The results demonstrated a good level of reliability. There was 86% agreement between raters and the gold standard for the examples of plans and goals and the transcript coding led to a 75% agreement with the gold standard. The differences between these scores could be because the transcript contained more text and could have led to a different parsing of the data and an increase in different codes. The parsing of the transcript data is an area that could be improved for future training and reliability of the coding system. The results, however, did show it can be taught to researchers within a 2 hour period and achieve good reliability across the coders.

The strengths of the development process were that the coding system was developed based on thematic analysis of real consultations from MI sessions on WLM. Bryman et al (2006) [190] stated that the "methodological goal of an instrument's development is when qualitative research is used to develop questionnaires and scale items so these can be more comprehensively based on the data". Therefore using the thematic analysis allowed the planning talk coding system to be comprehensively based on the MI data. It was also developed via a rigorous process of testing the coding system within the data repeatedly. To add to the rigour of the process it was tested via a group of researchers before the final version of the coding system was applied to all the data. This ensured that the coding system was easy to understand and could be applied to the data by researchers outside the MIMIC study group. Finally, the reliability of the coding system was tested and it was demonstrated that there was good reliability. This again was tested using real MI sessions strengthening the reliability of the coding system.

The main conclusions are that planning can be measured and the coding system can reliably be used by researchers. Researchers can also be trained in a short period of

time. The approach that I took to develop the coding system was based on the development of other coding systems [211 212]. The indutive and deductive approach also allowed for the coding system to be based on research evidence and the participant language.

However there is a limitation to the coding system as it was developed and tested for reliability on WLM data only. Therefore, it may not be generalisable to other data sets. The codes within the coding system have been developed to be general and not specific to weight loss data therefore it could be used with other data sets. It is possible to apply the coding system to data from other behaviour change areas, however, until further research has been conducted to test the reliability of the coding system with other MI data sets, results applying the coding system to other data sets should be interpreted with caution.

The next step in this study was to apply the coding system to all of the MI session data. This will be discussed in the next Chapter.

Chapter 5: Phase 2- Application of the planning talk coding system

5.1 Introduction

This Chapter presents the analysis and findings from the application of the coding system to the full MI session data set of 50 audio recordings. The coding system developed in Chapter 4 was used to analyse the MI sessions and convert the qualitative plans into quantitative counts. The aim of this Chapter is to present the results from using the coding system to code participant's plans and to summarise the plans made during the MI sessions. This Chapter will use the first person to demonstrate what I did to conduct the analysis.

5.2Method
5.2.1 Data

Fifty audio recorded face-to-face MI sessions on the topic of WLM derived from WILMA study participants (see Chapter 1) were analysed. One MI session per participant was selected. This was completed by listing all the participants and the sessions that had and had not been recorded and syntax was written that randomly selected a recorded session from each participant randomised. This is further explained in Chapter 4.

5.2.2 Data coding

The analysis of all the MI session data was conducted using the planning talk coding system. As mentioned previously in Chapter 4 it was developed based on thematic analysis with the focussed discussion group and a literature search. In this analysis of the MI session data the frequency counts for each of the types of planning talk were generated using the planning talk coding system. However it has been argued that when only the frequency of the codes are used, there is a danger of missing or misunderstanding the context [213]. To avoid this problem the planning talk coding system, used to analyse the data, was developed through an iterative process of thematic analysis of the data. This allowed the codes to retain the meaning that comes from the context of the data. The coding framework can be seen in Figure 6 (Chapter 4) and the full coding manual can be found in Appendix C4-3.

Initially I immersed myself in the data by reading the transcripts of each MI session while simultaneously listening to the audio recording. This allowed me to gain an accurate representation of the session and the context of the plan while coding. This is a

recommended approach when analysing data qualitatively as it allows the researcher to obtain a sense of the whole through reading and rereading [214]. This process allowed the complete picture conveyed by the data to be clear in my mind before applying the coding system. I then applied the coding system to all the MI sessions included in the study and generated frequency counts of the different types of planning talk that occurred per participant [215].

The coding system was developed based on the analysis of some but not all the MI sessions used in the study. As it was not based on every MI session the codes were initially flexible and subject to change. As I coded the MI sessions with the planning talk coding system I took note of any planning talk that could not be accounted for within the original coding system. These plans were then discussed within the focused discussion group to decide if the coding framework needed to be altered to accommodate a new code. If the decision was taken to alter the coding system I then recoded any MI sessions that had been previously coded with the original coding system.

Once all 50 sessions had been coded, the instances of the different types of plans and goal setting were counted up for each individual MI session. The frequency counts for each type of plan/goal for each individual MI session were exported to an Excel spreadsheet. This combined all the data from the coding system into one table ready for importing into SPSS and for analysis. This meant that all the qualitative data was thus converted into quantitative data in preparation for the analyses relating it to the WLM outcome data.

5.2.3 Inter-coder reliability

One criticism that has been applied to all qualitative approaches is that they lack the scientific rigour and credibility normally associated with quantitative methods due to the subjective nature of qualitative research. It is assumed that quantitative research happens within a value-free framework [216]. This is not necessarily the case, as quantitative research is also susceptible to biases such as transfer, bias, confounding, and bias from misclassification of exposure or outcome. However qualitative researchers must be seen to uphold similar rigor to that usually associated with quantitative research by being open to careful scrutiny, and any results should be measured against independently available evidence [217].

One approach to ensuring scientific rigour in qualitative analysis is inter-coder reliability. This refers to a second coder independently classifying material, the results of which are then compared with the initial coder. It is commonly used in qualitative research as a measure for improving reliability [218]. Therefore qualitative research can use techniques from the quantitative approach to help ensure scientific rigour.

Inter-coder reliability was used to assess the reliability of my coding of the data. Once I had coded all 50 MI sessions, three independent coders were assigned a random sample of 2 sessions each with an additional one session for two of the coders. Fifteen percent (8) of all sessions were double coded. The coders independently coded this data and the results of the coding of these sessions was compared with my original coding of the data and a percentage agreement statistic was calculated.

The decision was made not to use a kappa statistic but to use a percentage agreement. The coding system is complex with layering of codes that are dependent on one another. Using kappa would not present the data in a coherent manner due to the multiple codes there would be multiple kappas that would become meaningless (see Chapter 4 for further explanation). In the case of the percentage agreement, a percentage was calculated for the whole MI session allowing any disagreements between raters' coding to become apparent. Any differences that occurred between the coders were resolved through discussion as is usual with this dual coding process in qualitative research. If the decision was taken to alter the coding system I then recoded any MI sessions that had been coded with the previous coding system.

5.2.4 Computer assisted data analysis

The planning talk coding system involved assigning Sections of text data different codes and converting these codes into counts. NVivo 10 was used to assist with the coding, counting of frequencies of the types of planning talk and storage of the qualitative data.

The transcriptions of each MI session were imported into NVivo 10. All the codes from the planning talk coding framework were input into the software to allow me to assign codes to the data.

NVivo allows the researcher to keep notes of why a particular code was assigned to a piece of data. It is also possible to retrieve data coded under a particular category to allow the researcher to review all the data under that category. I used this facility when reviewing data already coded and when comparing codes with the second independent coder. I used it to aid the coding of the data and ensure consistency across the data.

NVivo also calculates the frequency counts of each code that is input and relates it to each source uploaded. I used this to keep a frequency count of each planning talk code for each participant in the study.

NVivo can be used for many purposes, for example conducting literature reviews and allows the researcher to be transparent about their approach [219]. I could have used NVivo to aid the systematic review. However in this intance I was using the programme to code sessions and attain frequency counts, therefore I used NVivo to its potential.

5.3 Statistical analysis

Summary statistics are presented including medians and the interquartile range (IQR) for the individual codes within the planning talk coding system. Distribution of data was examined by looking at histograms. Analysis of boxplots was also conducted to investigate any differences between the types of plans/goals.

5.4 Results
5.4.1 Descriptive statistics

Each participant had at least one MI session recorded in which they discussed weight loss or WLM. A total of 50 observations were available for analysis. Descriptive statistics are presented in Table 7.

The median number of total plans made within an MI session was 17 (see Table 7). Hypothetical plans were made the least often with a median of 0 as over half the participants made no hypothetical plans. The type of plan made most frequently by participants during sessions was 'continuing' plans with a median of 7 per session. The IQR demonstrates (see Table 7) that all the codes were used during the analysis of the 50 MI sessions although some types of codes were mentioned more often than others. Overall there were more plans than goals made within the MI sessions.

Table 7: Descriptive statistics of summary scores for each type of plan within the coding system.

Type of plan	Median	IQR
Total No. Plans	17	13-22.5
Future Plans	5	3-7
Future plans High Commitment	3	1-4.25
Future Plans Low Commitment	2	1-4
Future plans High Specificity	3	2-4
Future plans Low Specificity	1	0-3
Continuing Plans	7	4-11
Continuing Plans High Specificity	6	3-8.25
Continuing Plans Low Specificity	2	1-3
Goal Setting	2	1-4
Goal Setting High Commitment	1	0.75-3
Goal Setting Low Commitment	1	0-1
Goal Setting High Specificity	1	0-1
Goal Setting Low Specificity	1	0.75-3
Hypothetical Plans	0	0-1
Hypothetical Plans High Specificity	0	0-1
Hypothetical Plans Low Specificity	0	0-0
Past Plans	3	2-6
Total high commitment plans	3	0-7
Total low commitment plans	2	0-7
Total high specificity plans	10	2-23
Total low specificity plans	4	0-15

Histograms showing the distribution of each plan and commitment type are presented in Figure 9. The codes that are normally distributed are: the total number of plans, future plans, continuing plans, continuing high specificity, past plans, total high specificity plans and total low specificity plans. The remaining codes are all slightly positively skewed. These include: Future plans high and low commitment, future plans high and low specificity, continuing plans low specificity, goal setting, goal setting high and low commitment, goal setting high and low specificity, hypothetical plans and hypothetical

plans high and low specificity, total high commitment plans, total low commitment plans, total high and low commitment goals and high and low specificity goals. These histograms in Figure 9 test the assumption needed for linear regression that residuals (errors) of the regression line are approximately normally distributed. Therefore although there are some codes that are slightly postively skewed. This is minimal therefore the assumption for linear regression is met.

Figure 9a: Total number of plans

Figure 9b: Future plans

Figure 9c: Future plans high commitment

Figure 9d: Future plans low commitment

Figure 9e: Future plans high specificity

**Figure 9f: Future plans low specificity**

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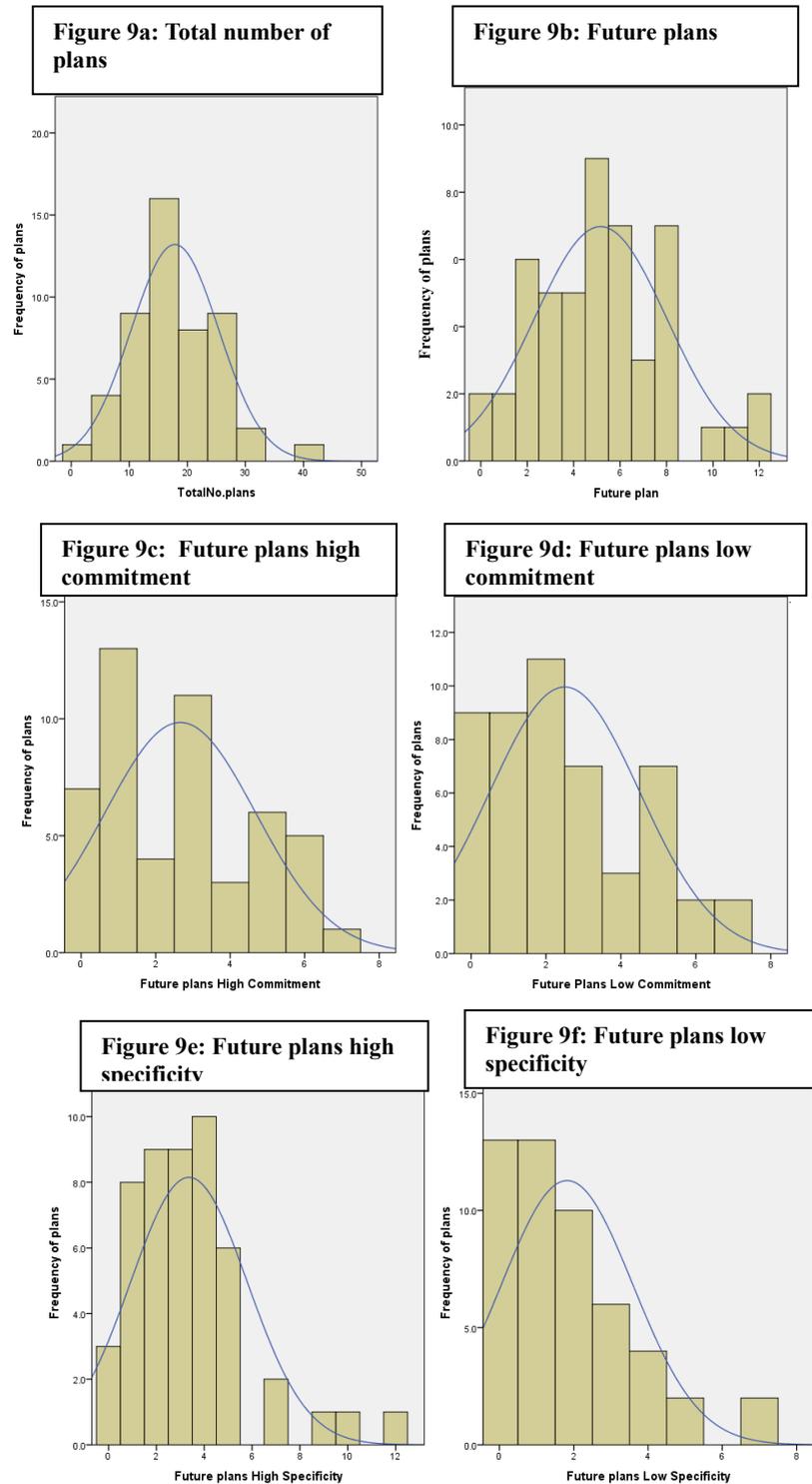
Figure 9g: Continuing plans
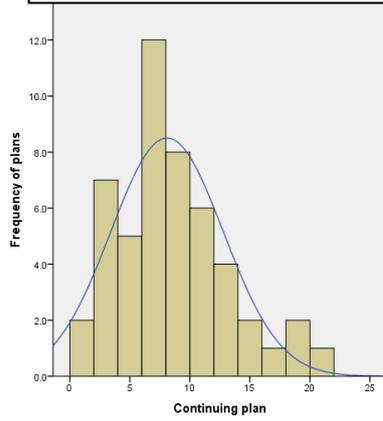
Figure 9h: Continuing plans high specificity
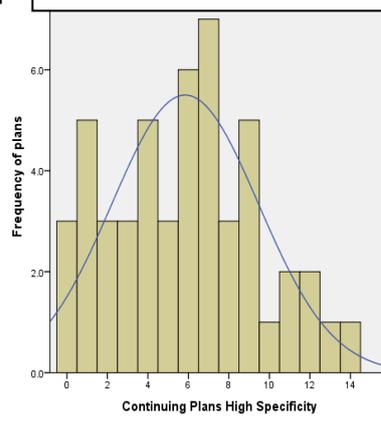
Figure 9i: Continuing plans low specificity
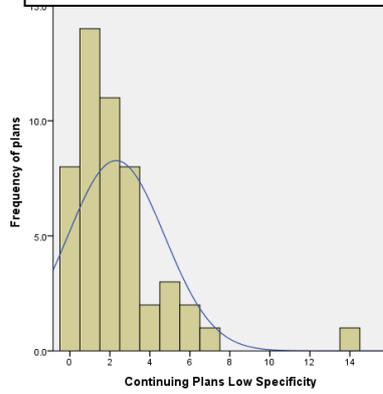
Figure 9j: Goal setting
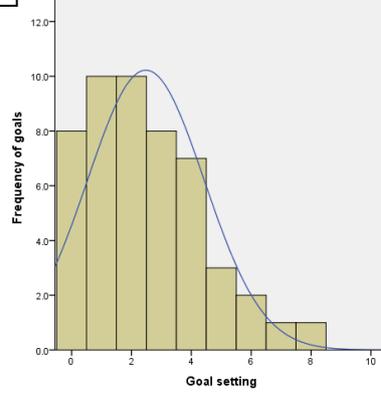
Figure 9k: Goal setting High commitment
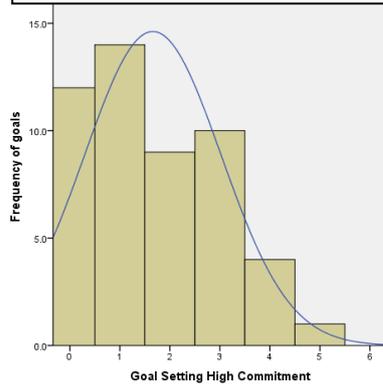
Figure 9l: Goal setting low commitment

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Figure 0m: Goal setting high specificity

Figure 9n: Goal setting low specificity

Figure 9o: Hypothetical plans

Figure 9p: Hypothetical plans high specificity

Figure 9q: Hypothetical plans low specificity

Figure 9r: Total high commitment plans

Figure 9s: Past plans

Figure 9t: Total Low commitment plans

Figure 9u: Total high specificity plans

Figure 9v: Total low specificity plans

Figure 9w: Total High commitment goals

Figure 9x: Total high specificity goals

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Figure 9y: Total low specificity goals

Figure 9z: Total low commitment goals

Figure 9: Histogram of the total number of plans and each code within the planning talk coding system

The types of plans and goals each participant made are displayed in Figures 10 to 16. All 50 participants are represented in these graphs however only every other participant number is labelled on the graph. The graphs show the trends in the types of plans and goals participants are making in general as well as examining individual level differences. Figure 10 shows that the most common type of plan coded for each individual is continuing planning. Future and past plans are coded less often. Hypothetical plans are mentioned the least. The total number of plans discussed per participant per MI session ranges from 1 to 39. The majority of participants discussed between 10 and 20 plans per MI session.

Figures 11 and 12 show future plans in more detail, illustrating the commitment and specificity of these plans. These bar charts indicate that the majority of future plans appear to have high commitment and high specificity. The majority of the continuing plans are coded as high specificity as indicated by Figure 13. As noted previously, very few hypothetical plans were made by the participants with some participants not making any (Figure 10). The majority of these plans are rated as high specificity which is in line with techniques used by the MI therapist to elicit ideas about what the participant could do to change their behaviours in certain situations. Past plans were mentioned by almost all the participants with numbers ranging from 13 to 0 in one MI session (Figure 10). Finally, Figure 10 indicates that the majority of participants set goals in the MI sessions. Goals were in general were rated as high commitment but low specificity goals (see Figures 15 and 16), meaning that participants expressed a real desire to achieve their goals but were less likely to set a time frame in which to achieve them.
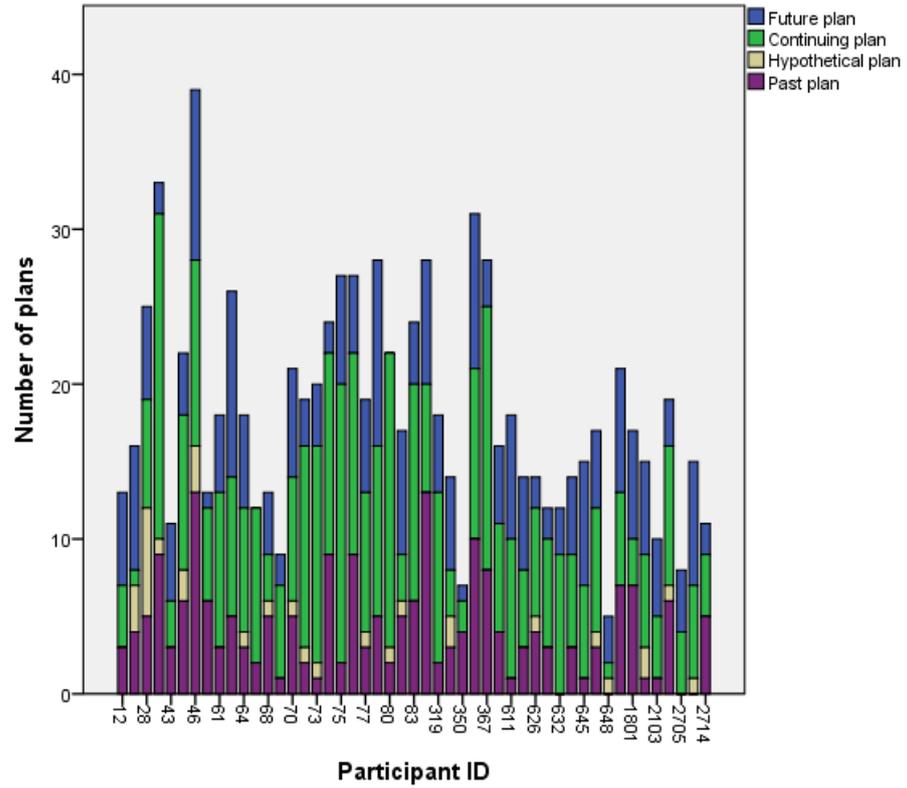
Figure 10: Frequencies of plans made per participant
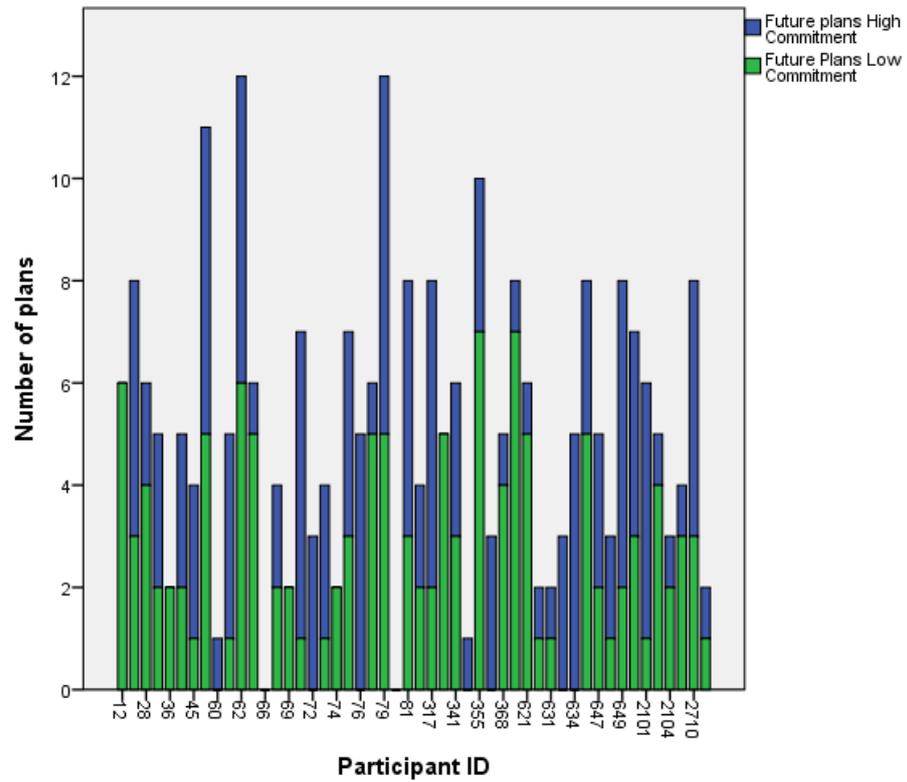
Figure 11: Stacked Bar chart of future high and low commitment plans

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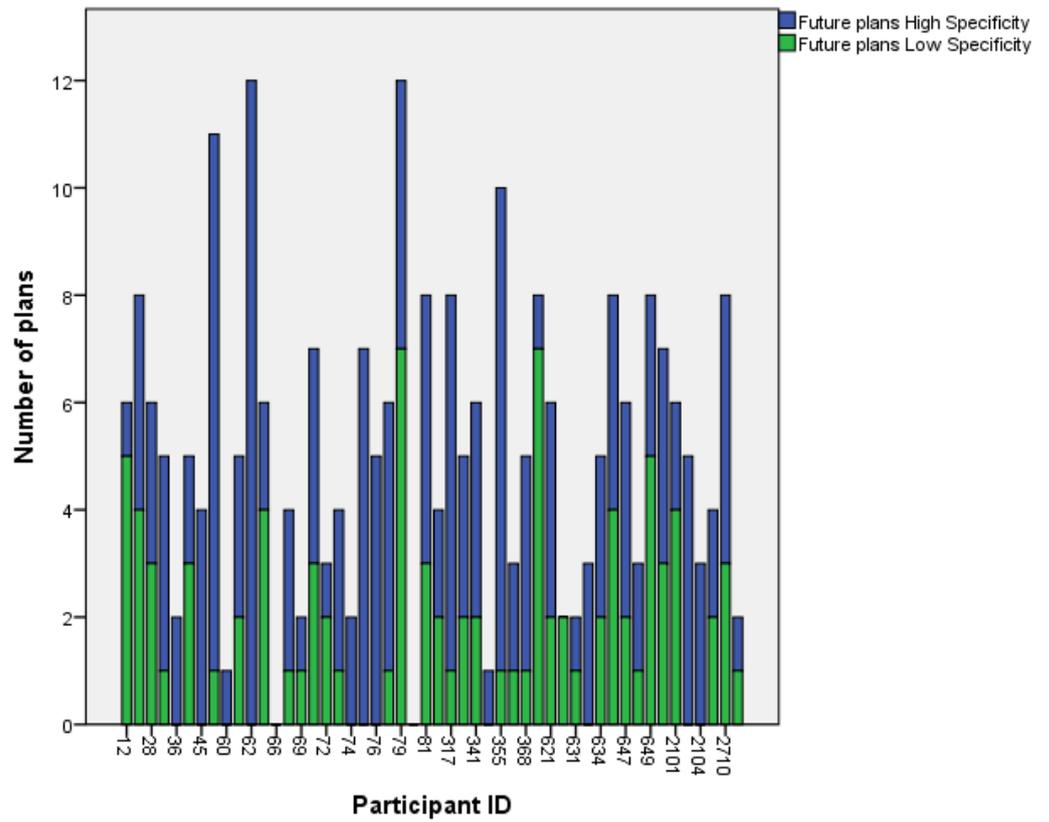
Figure 12: Frequencies of future high and low specificity plans
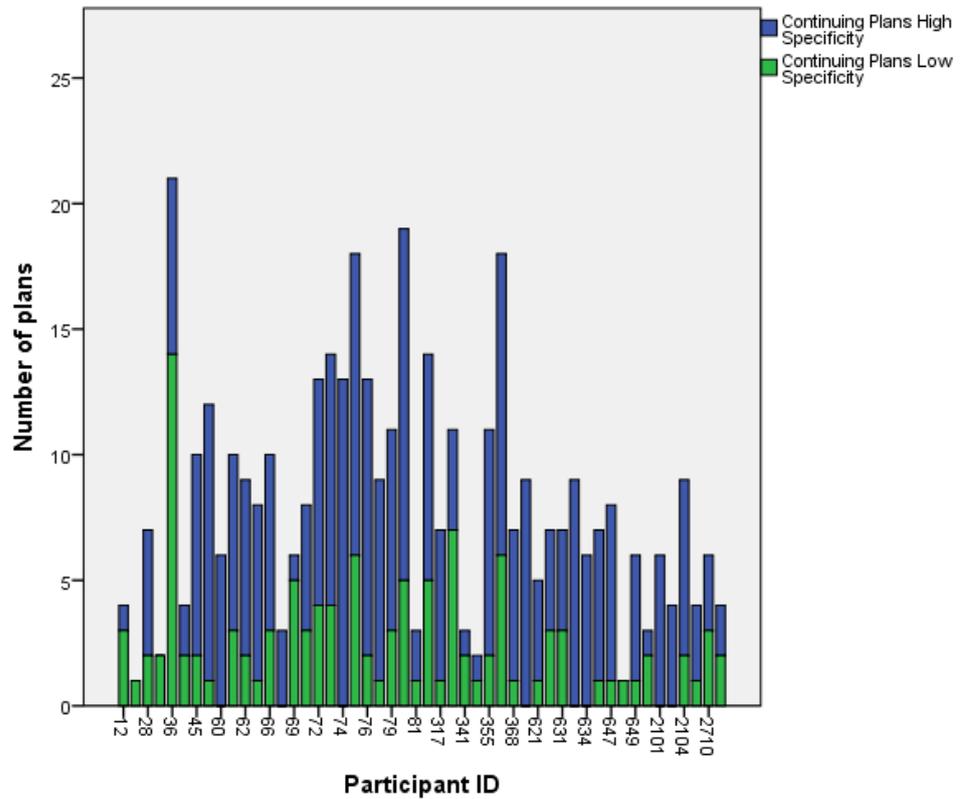
Figure 13: Frequencies of continuing high and low specificity plans

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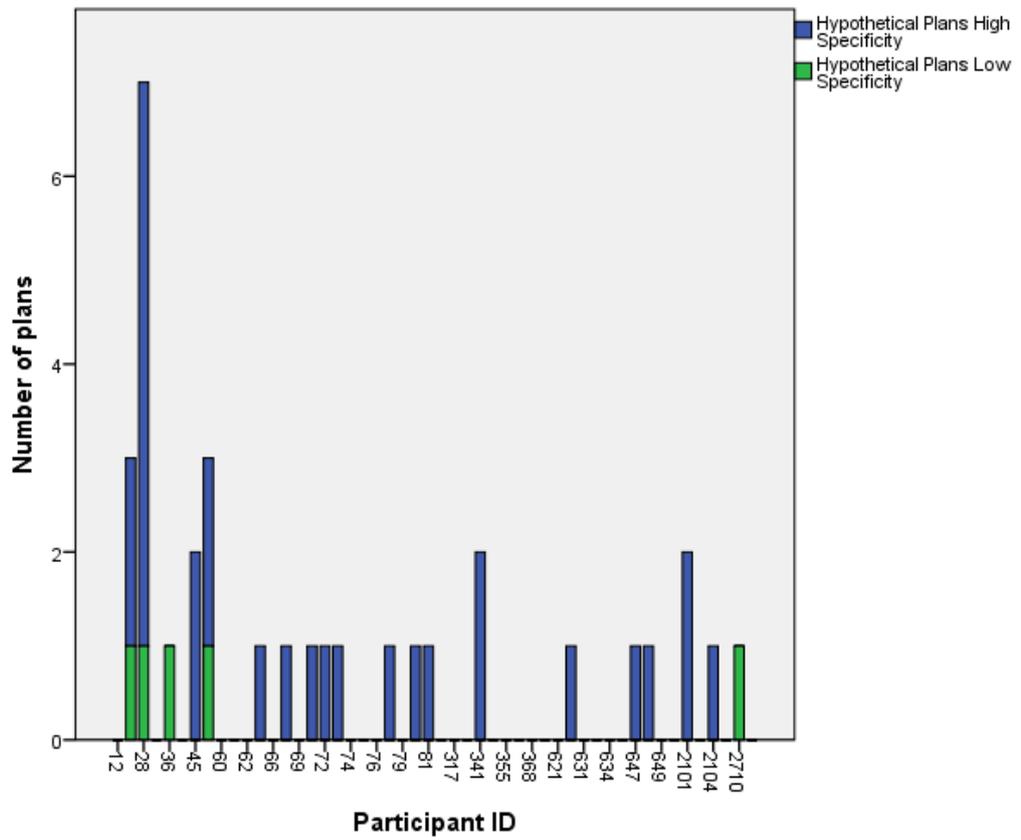
Figure 14: Frequencies of hypothetical specificity plans
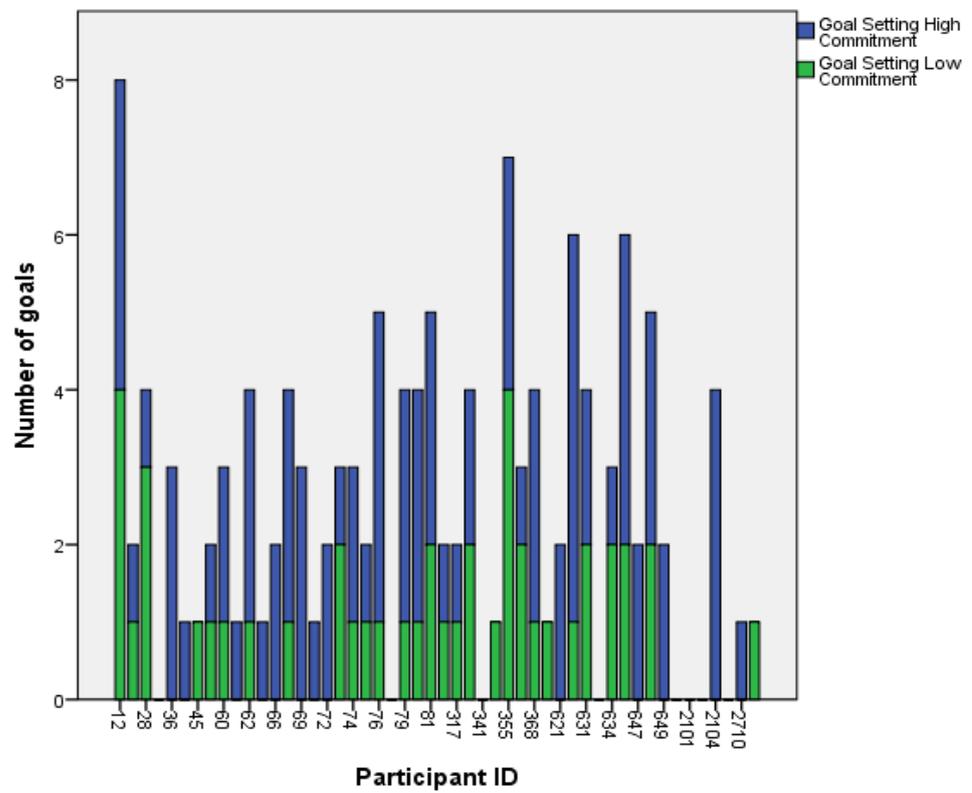
Figure 15: Frequencies of high and low commitment goal setting
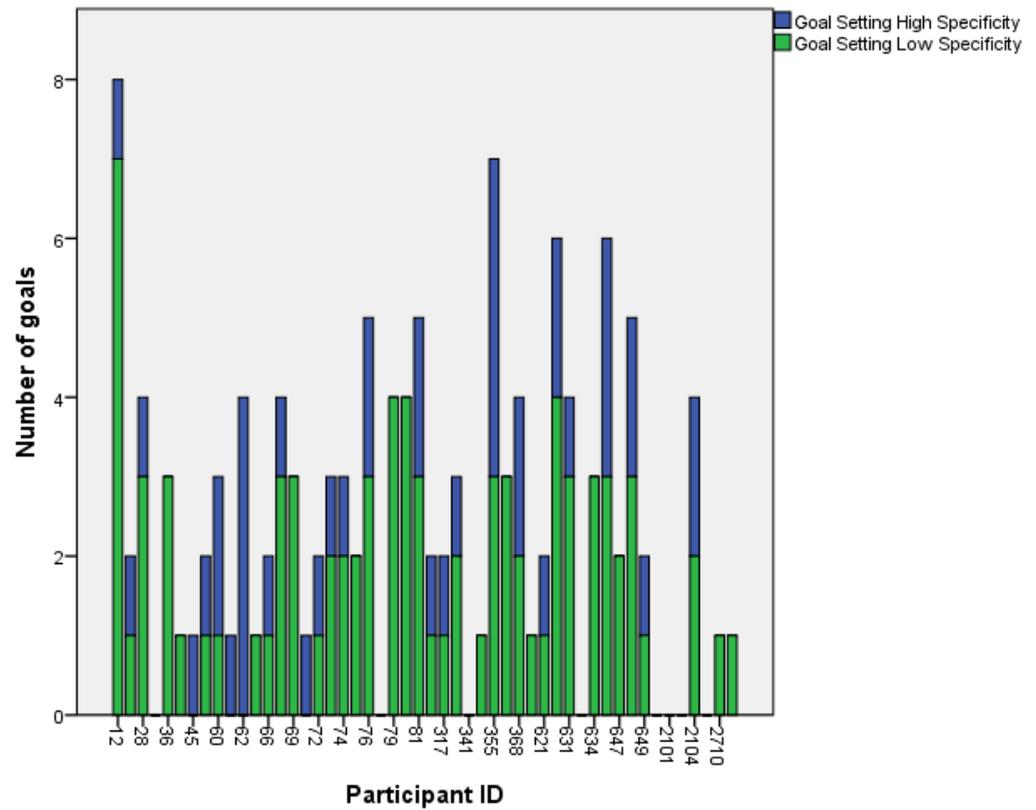
Figure 16: Frequencies of high and low specificity goal setting

Boxplots were used to compare all the types of plans/goals by trial arm (intensive versus less intensive) and to investigate any possible differences in distribution. As indicated by the boxplots (Figures 17 and 18) in general the pattern of numbers and types of plans is remarkably similar between the trial arms.
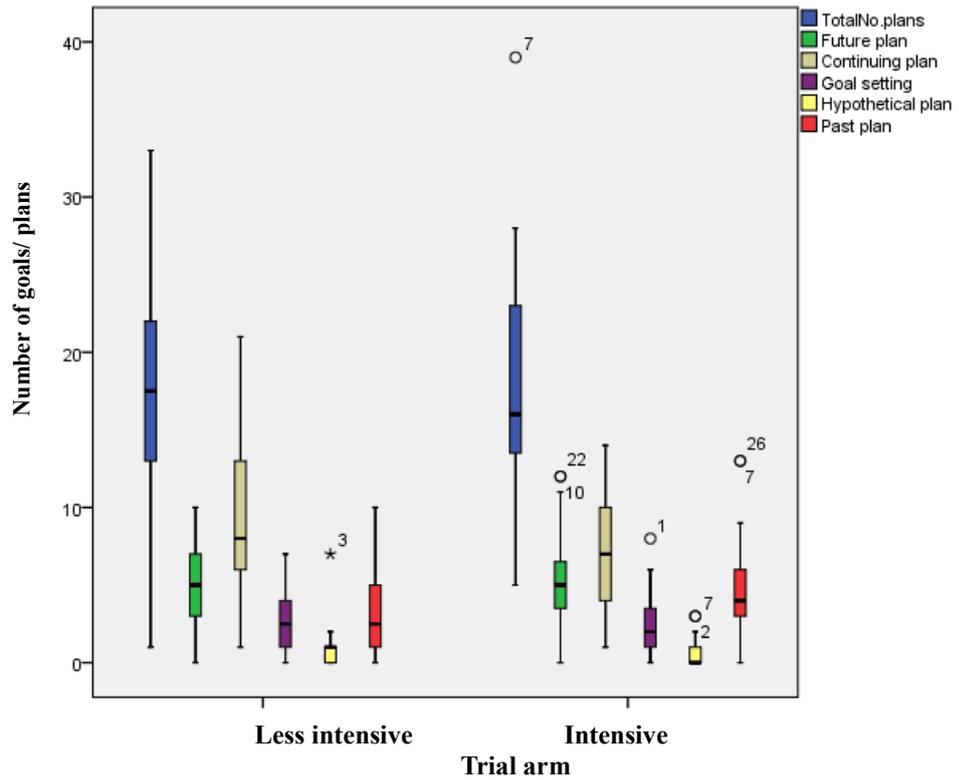
Figure 17: Boxplot of intensive verses less intensive intervention are for plans and goals.
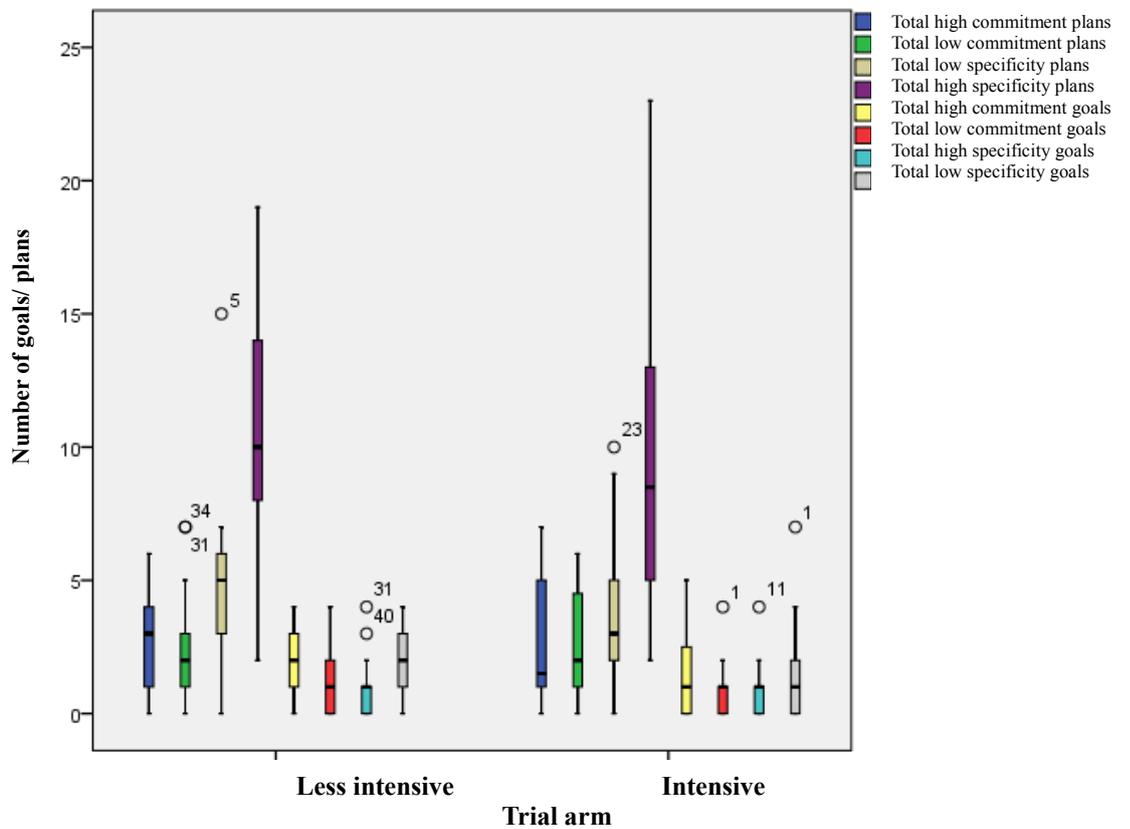
Figure 18: Boxplot of intensive verses less intensive intervention are for plans and goals

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5.4.2 Inter-coder reliability

Investigations were conducted into the reliability of the planning talk coding system when applied to the MI session data and used by more than one rater. A percentage agreement was used to calculate the reliability.

Table 8: Codes for Planning talk coding system categories

Code	Planning talk category
FP	Future plan
CP	Continuing plan
HP	Hypothetical plan
PP	Past plan
GS	Goal setting
HC	High commitment
LC	Low commitment
HS	High specificity
LS	Low specificity
NC	Not coded
Green	Agreement between coders
Red	Disagreement between coders

Table 9: Results from Inter-rater reliability coding for transcript 0080

Participant transcript 0080		
Lines coded	Coder 1	Coder 2
23--29	PP	NC
34-35	CP HS	NC
211-224	CP HS	CP HS
235-240	CP HS	CP HS
245-252	GS HC LS	GS HC LS
272-277	PP	NC
294-299	CP LS	CP LS
305-308	CP HS	CP HS
313-319	HP HS	NC
336-341	CH HS	CP HS
375-380	GS HC LS	GS HC LS
431-438	CP LS	CP LS
445-455	CP HS	CP LS
498-508	CP LS	CP LS
509-520	CP LS	CP LS
530-537	CP HS	CP HS
581-595	CP LS	CP LS
744-755	CP HS	CP HS
805-808	GS LC LS	GS LC LS
846-848	GS HC LS	GS HC LS
1003-1013	CP HS	CP HS
1038-1043	CP HS	CP HS
1044-1051	CP HS	CP HS
1116-1127	CP HS	CP HS
1194-1209	CP LS	CP LS
1327-1341	CP HS	CP HS
1357-1367	CP HS	CP HS
Additional		
172		GS LS LC
388-396		GS HC LS
808		CP LS
116-1167		CP LS
1342-1349		CP HS

Table 10: Results from Inter-rater reliability coding for transcript 0061

Participant transcript 0061		
lines coded	Coder 1	Coder 2
79-85	PP	NC
99-111	PP	NC
149-156	FP HC HS	FP HC HS
174-178	CP HS	CP HS
215-233	CP HS	CP HS
274-282	CP LS	CP LS
343-368	CP HS	CP LS
423-440	PP	NC
469-479	CP LS	CP HS
496-525	GS HC HS	GS HC HS
556-565	CP LS	CP HS
568-583	CP HS	CP LS
586-601	CP HS	CP HS
675-690	FP HC HS	FP HC HS
734-741	CP HS	CP HS
930-942	CP HS	CP HS
960-965	FP LC LS	GS LC LS
967-991	FP HC LS	FP HC HS
1328-1335	FP HC LS	CP LS
additional		
563		GS LS LC
572-573		GS LC LS

Table 11: Results from Inter-rater reliability coding for transcript 0076

Participant transcript 0076		
Line coded	Coder 1	Coder 3
38-41	CP HS	NC
41-44	PP	NC
58-63	FP HC HS	FP LC HS
64-67	CP HS	PP
69-77	CP HS	NC
119-125	PP	PP
130-137	FP HC HS	FP HC HS
235-242	FP HC HS	NC
246-252	FP HC HS	NC
284-298	CP HS	CH HS
316-322	PP	NC
337-348	CP HS	CP HS

354-368	PP	NC
370-374	PP	NC
404-407	CP HS	PP
408-420	PP	NC
452-464	CP HS	NC
468-474	FP HC HS	NC
485-495	GS HC LS	GS HC LS
497-527	GS HC LS	GS HS LS
555-570	PP	PP
577-594	CP HS	CP HS
621-638	CP HS	NC
644-651	CP LS	NC
695-707	GS HC HS	GS LC HS
726-739	CP HS	CP HS
741-747	GS LC HS	NC
747-753	GS HC LS	GS LC HS
783-792	CP HS	CP HS
841-847	PP	NC
Additional		
107	GS LC LS	
398-399	CP HS	

Table 12: Results from Inter-rater reliability coding for transcript 0621

Participant transcript 0621		
Line coded	Coder 1	Coder 3
23-30	CP HS	CP HS
50-56	PP	PP
68-76	CP HS	CP HS
87-99	PP	NC
116-153	CP HS	CP HS
156-166	CP LS	CP LS
243-256	FP LC HS	HP HS
278-304	FP LC HS	NC
307-322	FP HC HS	HP HS
330-334	GS HC LS	NC
361-372	FP LC LS	NC
375-387	FP LC LS	HP HS
387-400	CH HS	NC
402-409	PP	NC
409-415	FP LC HS	NC
597-606	GS HC HS	NC
additional		
30	CP LS	
421-423	FP HC HS	

Table 13: Results from Inter-rater reliability coding for transcript 0064

Participant transcript 0064		
Line coded	Coder 1	Coder 3
39-44	C HS	PP
51-86	C HS	C HS
101-113	C HS	C HS
132-138	C HS	C HS
160-167	C HS	C HS
207-210	C HS	C HS
264-274	C HS	C HS
326-353	FP HS LC	FP HS LC
407-420	GS LS HC	GS LS HC
424-430	CP HS	CPHS
495-500	PP	PP
544-549	C LS	CP LS
603-611	PP	PP
621 660	FP LH LC	NC
710-720	FP LS LC	NC
732-736	FP LS LC	NC
759-772	FP LS LC	NC
806-812	FP HS HC	FP LS LC
Additional		
line 10		PP
line 236		GS LS HC
387-390		CP LS

Table 14: Results from Inter-rater reliability coding for transcript 0619

Participant transcript 0619		
Line coded	Coder 1	Coder 4
649-653	GS HC LS	GS HC LS
657-665	GS HC HS	CP HS
688-700	FP HC LS	FP LC LS
705-710	PP	PP
712-717	FP HC LS	FP LC LS
Additional		
591	GS HC LS	
690	HP LS	
819	CP LC LS	

Table 15: Results from Inter-rater reliability coding for transcript 0069

Participant transcript 0069		
Line coded	Coder 1	Coder 4
16-19	PP	PP
19-24	CP LS	CP LS
45-71	GS HC LS	GS HC HS
130-135	CP LS	CP LS
130-135	CP LS	CP LS
216-226	CP LS	CP LS
291-304	CP LS	CP LS
313-324	CP HS	CP HS
363-370	GS HC LS	GS HC LS
387-393	CP LS	NC
400-424	FP LC HS	HP HS
447-456	FP LC HS	FP LC LS
additional		
25-26	PP	
53	GS LC LS	
61	GS LC LS	
224	HP LS	
224	HP LS	
303	CP HS	
325	HP HS	
410	HP HS	
414	CP HS	
499-501	CP HS	
522-524	GS HC LS	

Table 16: Results from Inter-rater reliability coding for transcript 0046

Participant transcript 0046		
Lines coded	Coder 1	Coder 4
8	pp	NC
9 to 11	PP	NC
29-45	CP HS	CP HS
58-66	FP HS HC	
81 -90	CP HS	CP HS
96-130-	CP HS	CP LS
143-149	CP HS	NC
155-163	PP	NC
192-199	PP	GS HC HS
274 279	PP	PP
337 340	GS LC HS	NC
355 374	FP HC HS	FP HC HS
380 388	PP	NC
413- 420	CH HS	CP HS
420-425	PP	NC
427-434	FP HC HS	FP HC HS
445-448	PP	PP
459-463	FP LC HS	NC
470-502	CP HS	CP HS
504 519	FP HC HS	NC
526-528	CH HS	NC
528-538	HP HS	NC
558-568	FP HC HS	NC
599-614	CP LS	NC
622-628	PP	PP
633 645	CH LS	CP LS
680-686	HP LS	NC
694- 704	PP	NC
709-716	PP	PP
728-739	PP	NC
766-769	FP LC HS	FP LC HS
777-789	FP LC HS	FP LC HS
797-829	FP LC LS	FP LC LS
831-866	CP HS	CP HS
881-916	HP HS	NC
976-988	GS HC LS	GS HC LS
995-1004	FP HC HS	NC
1019-1022	FP LC HS	FP LC HS
1022	PP	PP
1024	CP HS	CP HS

The percentage agreement calculated from Table 9 was 72.5% and from Table 10 was 61.2% for coder 2. The coding disagreements were discussed between raters, however, no changes to the coding system were required. Therefore recoding of the data set was not required. This demonstrates relatively good reliability between raters. For coder 3 the percentage agreement calculated from Table 11 was 37% and from Table 12 was 26%. For coder 4 the percentage agreement calculated from Table 13 was 43% and from Table 14 was 41%. The coding disagreements were discussed between raters and again it was found that no changes to the coding system were required. However, the agreement was poor and from the discussion it was concluded that the time between developing the coding system and applying it to the data had impacted on the reliability between the coders. It was decided that after retraining, coders 3 and 4 would recode one session each to assess if there had been an acceptable level of improvement in the agreement. After this training coder 4's percentage agreement as calculated from Table 16 was 50%. This was due to the difficulty in parsing the MI session and the unfamiliarity with counselling session dynamics. Coder 3's percentage agreement as calculated from Table 16 was 61%. This was in line with coder 2's results.

5.5 Discussion

The aim of this Section was to apply the planning talk coding system to the 50 MI sessions and to convert the data into counts of the different codes so they could be used to relate the planning to WLM outcomes. The results indicated that the planning talk coding system did not have any redundant codes. Descriptive statistics of the summary scores showed that all the codes were used during the coding process. The inter-coder reliability of the coding system was also assessed to support the aim of this Section. It was found that there was an average percentage agreement of 61.2%, after coders 3 and 4 were retrained. There was a fair level of inter-coder reliability after training therefore no changes were made to the overall coding of the data by coder 1. It was however found that recent training on the coding system is vital to ensure reliability and that the coding system is used as the manual intends. The retraining of coders 3 and 4 highlighted again that the parsing of the text can change the reliability of the coding system. Parsing is how text is chunked together. Similar to the results from the reliability testing in Chapter 4 coders 3 and 4 needed further training in parsing the MI session. Unlike Chapter 4, coders 3 and 4 coded a whole MI sessions in which plans were repeated. This highlighted the importance of following the repetition the of plans rule within the coder manual which coders 3 and 4 needed retraining in to ensure

reliability. This retraining should happen on a regular basis, every six months. As it only takes 2 hours to train a person on the coding system the retraining could be a 1 hour session which would help ensure consistency of inter-rater reliability. For future training there should be more of a focus on the most critical parts of the manual, and people should be directed to re-read these areas specifically before coding Therefore the primary aim was successfully achieved.

The main finding was that on average more plans were made per MI session than goals. This may be because one needs to make multiple plans to achieve a single goal. This has been demonstrated within the action and coping planning literature [126]. For example both action and coping plans to achieve a goal of increasing physical activity. An individual might make an action plan to go running in the park every Wednesday and a coping plan for a holiday to go to the hotel gym on Wednesday and use the treadmill. One study found that the combination of high levels of action planning and coping planning was associated with increases in PA [126].

The goals and plans data were also examined in more depth in relation to commitment and specificity. Goal setting indicates that people were committed to the goals they set but were less likely to specify timelines for when they were going to achieve them. Participants therefore are less likely to have highly specific goals compared to plans. This could be because they are reluctant to specify a time line to achieve a goal by in case they fail to achieve it, which would then lead to decreased motivation. This could be based on previous experience of not achieving goals set. Another potential reason could be that the therapists in the MI intervention were encouraged to ask the clients to set time lines for plans but not for goals.

The results were examined in further detail to investigate the frequencies of the types of plans made. On average some plans such as continuing plans were used more often than others such as hypothetical plans. Continuing plans were mentioned the most which would fit with the type of participant recruited into the study. All of the participants had already lost 5% of their body weight meaning that they had already implemented plans to lose or maintain weight. Therefore it is expected that the participants have plans that they want to continue to use. The majority of the continuing plans were also coded as high specificity. As all of these plans are continuing to be enacted at the time of the MI session, participants may be more aware of the times these plans take place as they

enact them regularly. There were slightly less future plans than continuing plans being made, however these may also be important in relation to outcome. The majority of future plans appear to have high commitment and high specificity. Future and continuing plans may be better associated with WLM outcomes as the participants are committed to enacting them and know what they need to do and when they need to change their behaviour. The therapists within the MI intervention were also asked to encourage clients to set when and where the plans would be enacted as it was hoped this would lead to better outcomes.

In figure 17 and 18 there appears to be no difference between trial arm in the number of plans or goals that people make. This is a surprising as there was a difference in the number of sessions people received in trial arms. However there are only 50 participants therefore this sample size may be too small to detect differences in the numbers of plans or goals between the trial arms. Therefore there may not be an issue with the coding system in terms of detecting plans but simply that the sample size is too small to detect the difference.

These initial results indicate that the planning talk coding system can be successfully applied to all the data. They also indicate that more plans are being made on average than goals, in line with recent literature. A study has found at baseline, intentions were moderately high (M = 2.9, SD = 0.9), however action planning (M = 2.3,SD = 1.2) and coping planning (M = 2.0, SD =1.4) added together lead to a higher mean outcome than the intention mean outcome [126]. Results were also similar at follow up. The results of the inter-rater reliability were on average 61.2% percentage agreement after coders 3 and 4 were retrained. This is in line with other studies that have used the MISC or the MITI. These studies [53 220-222] have found an inter-rater reliability score of between 0.59 and 0.95 is dependent on whether they are global scores or behaviour counts. In the next Chapter plans and goals will be examined in relation to outcomes to evaluate if plans are better associated with outcomes than goals. The types of plans most associated with WLM outcomes will also be explored.

Chapter 6-Phase 2- Planning talk and outcome: quantitative analysis

6.1 Introduction

This Chapter presents the next phase of the study examining potential relationships between plans coded within MI sessions and the weight outcome data. The tool developed in Chapter 4 was used on recorded WILMA transcripts. This allowed for the quantification of goals and plans and sub-categories of both, in the WILMA data. The main aims of the thesis was to examine the association between plans and weight outcomes therefore formal statistical techniques were then used to investigate associations between these goals and plans and various outcomes.

6.1.1 Aims

Primary

The primary objective was to investigate whether the total number of plans made was related to BMI measured at 12 month follow-up controlling for age (18-29/30-59/>59), gender, ethnicity (White/Non-white), source of recruitment (GP practices/ Exercise on referral schemes/ Slimming World/ Other), percentage weight loss (5-10%/ >10%), baseline BMI (30 – 40/>40), trial arm, motivation for maintaining a weight loss and total number of plans.

Secondary

Secondary analyses investigated whether any of goal setting, future plans, continuing plans, past plans or hypothetical plans were associated with either maintaining a weight loss, weight or BMI controlling for individual patient characteristics.

6.2 Methods
6.2.1 Sample size justification

The sample size was determined by the number of participants that had at least one face to face MI session recorded and had given consent for the recording to be used. The sample size for this study was 50 participants. This provides 25% power to detect a difference of 1.47 kg with a standard deviation of 4kg [12] as statistically significant at the 5% level. However, the MIMIC study was an exploratory study and the WILMA study was a feasibility trial, therefore the focus was not on finding statistical significance. The associations were interpreted using the 95% confidence interval (CI) around the effect size.

6.2.2 Data

The data were obtained through the WILMA study as explained in Chapter 1. Data were collected at baseline, 6 and 12 months. The main follow-up was at 12 months and was carried out by a face-to-face interview. If face-to-face was not possible, a minimum dataset was collected over the phone. A number of different outcome measures were collected (outlined in Chapter 1). The outcome measures included in the MIMIC study were selected as they were the key outcomes for the WILMA study relating directly to weight maintenance. The outcomes were measured and calculated as stated below:

- Weight was measured using calibrated digital scales and recorded in kilograms.
- BMI was measured using calibrated digital scales and a stadiometer. BMI was calculated using the calculation, mass in kg/ height(m) ^{2}.
- Maintaining weight loss was coded either yes or no. It was calculated using the 12 month follow-up weight minus the baseline weight. If the participants calculated difference in weight was zero or less they were coded as maintaining a weight loss. If the participant's calculated difference in weight was greater than zero they were coded as not maintaining weight loss.
- Motivation was measured using a Likert scale which captured baseline motivation via the questions; "How motivated do you feel to maintain your weight" with 1 being very motivated and 5 being "not at all motivated".

The planning talk data was collected via audio recordings of the MI sessions conducted during the WILMA study stated in Chapter 1. As described in Chapter 5 the coding system was applied to the 50 MI sessions and frequencies of the different codes were calculated per participant. The following variables were created.

- Total number of plans: this comprised the total number of future, continuing, hypothetical and past plans per participant.

- Future plans: the total number of future plans per participant.

- Continuing plans: the total number of continuing plans per participant.

- Hypothetical plans: the total number of hypothetical plans per participant.

- Past plans: the total number of past plans per participant.

- Goal setting: the total number of goals per participant.

- Total high commitment plans: this is comprised of the total number of high commitment future plans per participant.

- Total low commitment plans: this is comprised of the total number of low commitment future plans per participant.

- Total high specificity plans: this is comprised of the total number of high specificity future, continuing and hypothetical plans per participant.

- Total low specificity plans: this is comprised of the total number of low specificity future, continuing and hypothetical plans per participant.

- Total high commitment goals: the total number of high commitment goals per participant.

- Total low commitment goals: the total number of low commitment goals per participant.

- Total high specificity goals: the total number of high specificity goals per participant.

- Total low specificity goals: the total number of low specificity goals per participant.

The variables were also trichotomised for further analysis into low, medium and high categories, as there was uncertainty that planning data would be linearly related to the WLM outcome data. Also the small number of participants meant that a linear relationship would be difficult to demonstrate. The variables were: total plans, goal setting, future plans, continuing plans, past plans, hypothetical plans, total high and low specificity plans, total high and low commitment plans, total high and low specificity goals, total high and low commitment goals.

The categorisation was conducted using the frequency table for each variable. As there were three categories the frequency was split into thirds meaning each category was equal. Low was categorised as the number of occurrences of the variable that corresponded with 33% frequency. Medium was categorised as the numbers of occurrences of the variable that corresponded with 33% to 67% frequency. High was categorised as the numbers of occurrences of the variable that corresponded with 67% frequency and upwards. For example, for the low number of total plans category the frequency of plans was between 0 and 13. Table 17 demonstrates how many occurrences of a plan or goal were categorised into each group.

6.3 Data analysis
6.3.1 Descriptive statistics

Descriptive summaries including frequencies and medians, of baseline demographic, baseline and 12 month questionnaire data and planning talk data were tabulated (see Table 17). Graphical illustration (boxplots, histograms and bar charts) was used where appropriate and the distributions of all outcome measures were graphically checked for normality.

6.3.2 Primary outcome analysis

The primary objective was to investigate whether the total number of plans made was associated with BMI measured at 12 months controlling for individual patient characteristics in a linear regression.

6.3.3 Secondary outcome analysis

The secondary objectives for this study were to examine whether goal setting or types of plan were related to weight outcomes at 12 months.

The linear and logistic regression models included the following independent variables: plans/goals variable, age, gender, recruitment method, percentage weight loss at baseline, baseline BMI, ethnicity and trial arm.

The multiple linear models contained 11 independent variables (planning variable x2, age, gender, recruitment method, percentage weight loss at baseline, baseline BMI, baseline weight, ethnicity, and trial arm). Baseline weight was not included in the multiple logistic regression.

6.4 Results

6.4.1 Trichotomised variables

The number of occurrences of a plan or goal were categorised into low, medium and high and the results are presented in Table 17.

Table 17: Number of plans and goals for trichotomised variables

Plan/ Goal variable	Low	Medium	High
plans	0-13	13-20	21+
goals	0	1-3	4+
future plans	0-2	3-5	6+
continuing plans	0-5	6-8	9+
hypothetical plans	0	1	2+
past plans	0-2	3-4	5+
high commitment plans	0	1-3	4+
low commitment plans	0	1-3	4+
high specificity plans	0-6	7-12	13+
low specificity plans	0-2	3-5	6+
high commitment goals	0	1	2+
low commitment goals	0	1	2+
high specificity goals	0	1	2+
low specificity goals	0	1	2+

6.4.2 Demographic data

The characteristics of the participants who took part in the MIMIC study are displayed in Table 18:

Table 18: Participant characteristics

Baseline measures	Mean	SD
Age	49.94	12.34
Baseline measures		
Weight	90.47	19.50
Height	164.89	7.17
Waist	102.15	16.19
Hip	117.70	12.38
BMI	33.15	6.26
Gender		
Male	14% (n=7)	
Female	86% (n=43)	
Ethnicity		
White British	90%	
white Irish	2%	
Other white background	4%	
Other	4%	

6.4.3 Descriptive statistics for weight outcomes

The descriptive statistics for the planning variables have been presented in Chapter 5 (Table 7), therefore only the weight outcomes at 12 month follow-up are presented here. The descriptive statistics describe 45 out of the 50 participants as 5 participants were lost to follow up. The mean BMI at follow up was 32.6 kg/m² which is still in the obese range however the interquartile range suggest this ranges from normal BMI to morbidly obese (IQR: 23.12 – 46.26 kg/m²) (Table 19). The mean weight at follow up was 89.2kg with 20 out of 45 (44%) participants maintaining a weight loss. The BMI and weight data had a normal distribution. Histograms of BMI and weight are presented in Figure 19.

Table 19: Descriptive statistics of BMI and weight 12 month outcomes

	N	Mean	SD	IQR
BMI (kg/m²)	45	32.61	6.23	23.12 – 46.26
Weight (kg)	45	89.18	19.44	54.3 - 134

| BMI (kgm2) | Weight (Kg) |
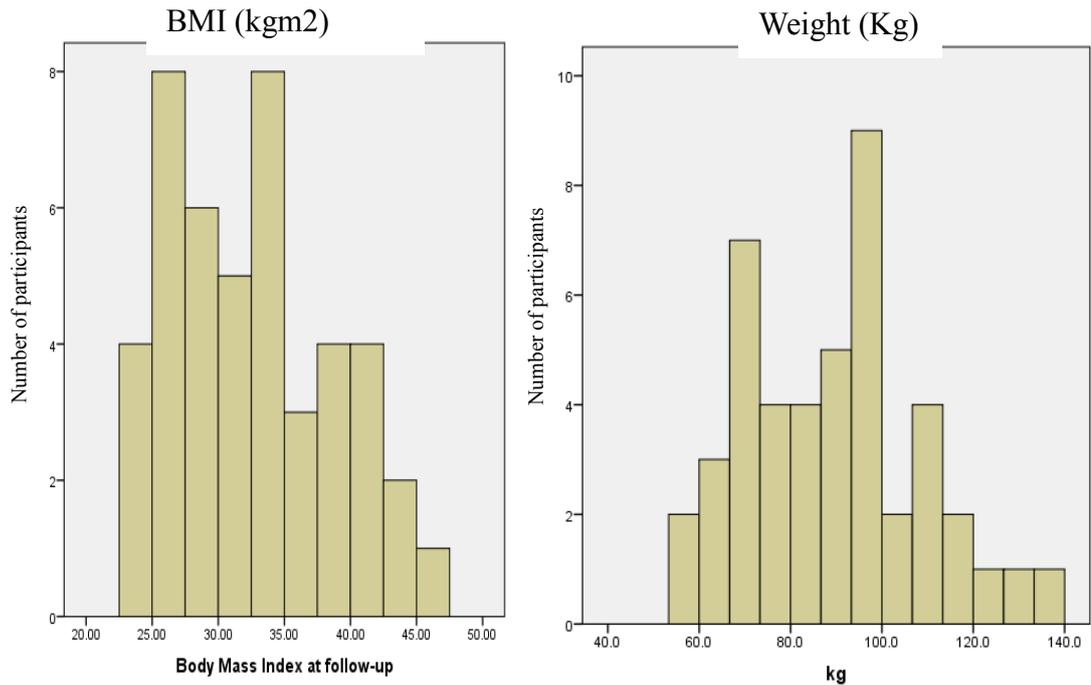
Figure 19: Distribution of BMI and Weight at follow-up

6.4.4 Primary outcome results

The results show that, when controlling for the individual patient characteristics, the total number of plans were potentially associated with lower BMI though this was not statistically significant. The 95% CI's though rule out harm from the intervention and indicate there may be some potential benefit. Based on the point estimate a person's BMI may decrease by about one tenth of a BMI point (0.1kg/m²) per plan made, however the 95% CI reveals that each additional plan could potentially increase BMI by a similar amount or indeed reduce BMI by two times as much (-0.2, 0.0). The linear regression results are presented in Figure 20 (and in Appendix C6-1).

Total plans, goals, types of plans and weight outcomes
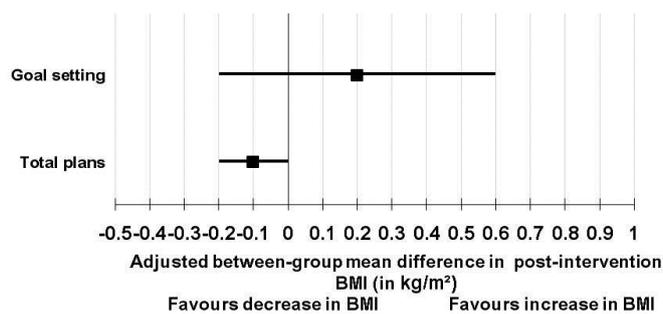
Figure 20: 95% confidence interval for total plans, goals of plans and BMI

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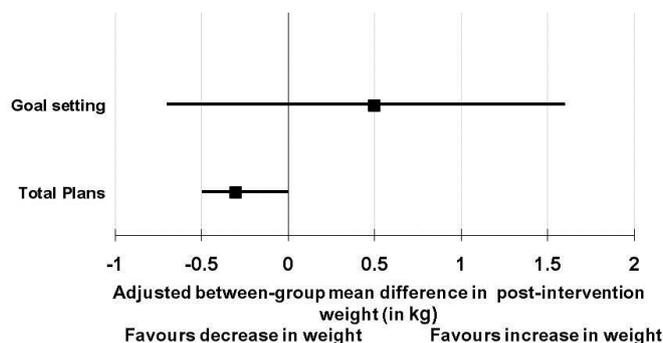
Figure 21: 95% confidence interval for total plans, goals and weight

6.4.5 Secondary outcomes results

6.4.5.1 Secondary outcomes: Continuous variables and weight outcomes
Linear and Logistic regression

Initially plans and goals were examined in relation to the WLM outcomes in separate regression analyses. These results are presented below.

Total plans, goals and weight

Linear regression was conducted to examine the association between total plans and weight at follow up. The association was statistically significant and showed that for every plan there was a decrease in weight of -0.3kg (see Figure 21 and Appendix C6-1). The 95% CI ranges from -0.5kg to 0.0kg. This range was skewed towards benefit again showing some support for the hypothesis that planning may help participants reduce their BMI.

Goals were not associated with a decrease in weight (0.5, (-0.6, 1.6)).

Goals and BMI

Goals were not associated with a decrease in BMI (0.2, (-0.2, 0.6)).
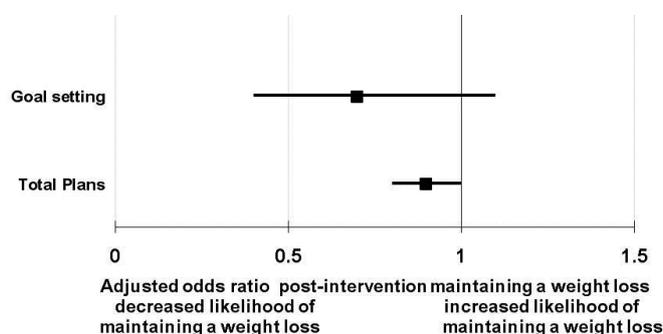
Figure 22: 95% confidence interval of odds ratio for total plans, goals and maintaining a weight loss

Total number of plans goals and maintaining a weight loss

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Logistic regression was conducted to examine the association between total number of plans and proportion maintaining weight loss at follow up. The total number of plans had an odds ratio of 0.9 with a 95% CI of 0.8 to 1.0 (see Figure 22 and Appendix C6-1). This indicates the odds of maintaining a weight loss decrease with each additional plan (see Figure 22 and Appendix C6-1).

Goals were associated with a possible decrease in the likelihood of a participant maintaining their weight loss as indicated by the coefficients and 95% CIs in Figure 22.

Logistic and linear regression

The total plans and goal variables were examined together in the same model in relation to the WLM outcomes. The results are presented below.

Total plans, goals and weight outcomes
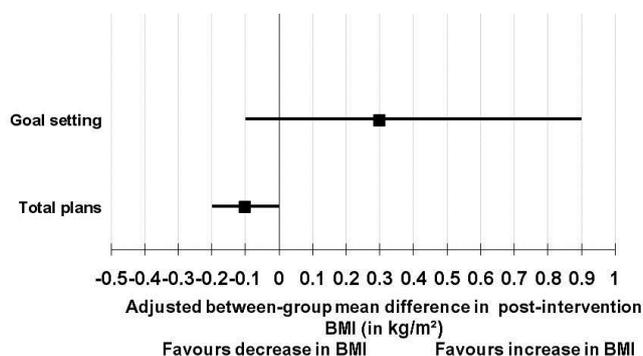
Figure 23: 95% Confidence interval for goals, plans and BMI
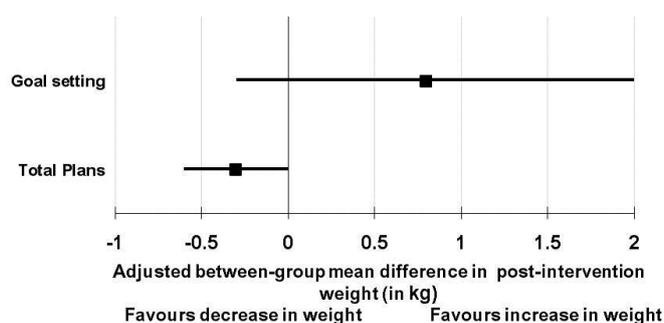
Figure 24: 95% Confidence interval for goals, plans and weight

BMI and weight

Linear regression was conducted to examine the association between total goals, total plans and BMI and weight at follow up. Total goals appear to be associated with a potential 0.3kg/m² increase in BMI per goal set (-0.1, 0.9) (see Figure 23 and Appendix C6-1). The results also suggest that goals were potentially associated with an increase of 0.8kg per goal set (see Figure 24 and Appendix C6-1).

Total plans were associated with a decrease in BMI (-0.1, (-0.2, 0.0)) and weight (-0.3, (-0.6, 0.0)). The coefficients and 95% CIs indicate that for every additional plan made a participant's BMI could decrease by 0.1kg/m² (see Figure 23 and Appendix C6-1). There was also a statistically significant association between total plans and weight. For every additional plan made a participant's weight decrease by 0.3kg (see Figure 24 and Appendix C6-1). Therefore plans possibly help to decreased BMI and weight whilst goals possibly increase BMI.
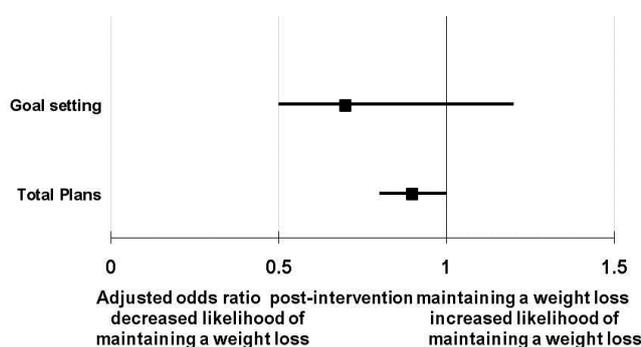
Figure 25:95% Confidence interval for goals, plans and maintaining a weight loss

Maintaining a weight loss

Logistic regression was conducted to examine the association between total goals and plans and maintaining a weight loss at follow up. Total goals had a 95% CI skewed towards zero indicating, that the more goals made the less likely the participant was to maintain their weight loss (0.7, (0.5, 1.2)). Planning results indicated the odds of maintaining a weight loss decrease with each additional plan. (see Figure 25 and Appendix C6-1).

6.4.5.2 Secondary outcomes: Categorisation variables and weight outcomes

Further analysis was conducted examining the variables trichotomised into high medium and low levels of planning. This took into account that there may not be a linear relationship between planning and WLM outcomes. The medium and high categories were compared to the low category of each variable. Initially the trichotomised plans and goals were examined in relation to the WLM outcomes in separate regression analyses. These results are presented below.

Plans, goals and weight outcomes

Plans and goals and BMI and Weight
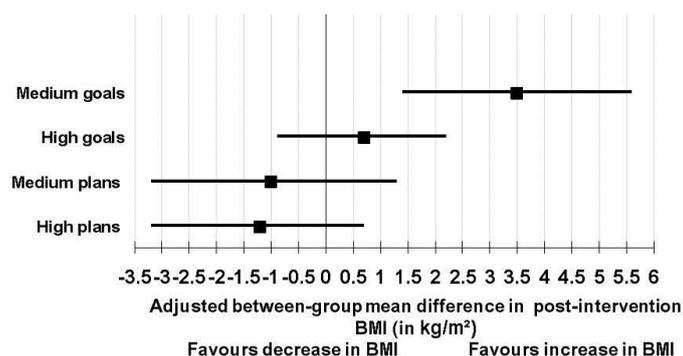
Figure 26: 95% Confidence interval for categorised goals, plans and BMI
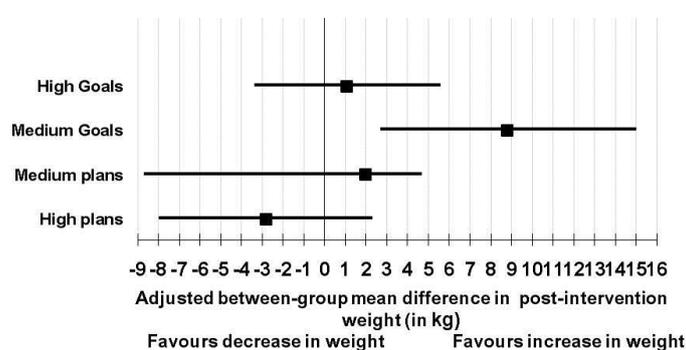
Figure 27: 95% Confidence interval for categorised goals, plans and weight

Those who were frequent planners lost on average 2.8 kgs (-8.0, 2.3) (see Figure 27 and Appendix C6-2) more than those who were low planners, albeit not statistically significantly. When plans and BMI were examined, the associations were again statistically non-significant. High planners could potentially lose on average 1.2kg/m² (-3.2, 0.7) (see Figure 26 and Appendix C6-2) compared to those who are low planners. Medium planners could potentially lose on average 1kg/m² (-3.2, 1.3) and 2kg (-8.7, 4.7) (see Figure 26 and 27 and Appendix C6-2) compared to those who are low planners.

Goals and weight and BMI were also investigated. It was found that there was a statistically significant increase on average for weight (8.8kg) (2.7, 15) (see Figure 27 and Appendix C6-2) for medium goal setters and BMI (3.5 kgm²) (1.4, 5.6) (see Figure 26 and Appendix C6-2) for medium goal setters compared with no goal setters.

Maintaining a weight loss
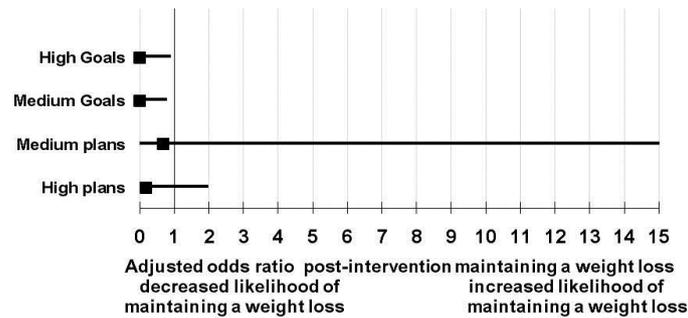
Figure 28: Odds ratio for categorised goals, plans and maintaining a weight loss

The results indicate that being a high planner potentially leads to a participant being 80 times less likely to maintain their weight loss (0.0, 2.0) (see Figure 28 and Appendix C6-2). For the medium planners there were not enough participants in this category to draw any conclusions. When examining goals and weight loss maintenance, the results indicated that comparing both high and medium goal setters to low goal setters that both groups are statistically significantly less likely to maintain a weight loss.

Logistic and linear regression

The trichotomised plans and goals were then examined in relation to the WLM outcomes in the same regression analyses model. These results are presented below.

BMI and Weight
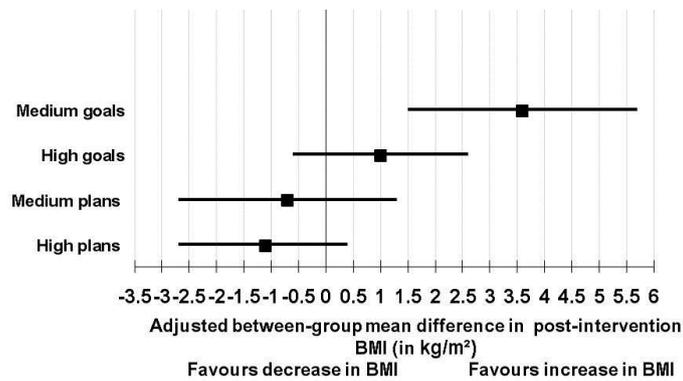
Figure 29: 95% Confidence interval for categorised goals, plans and BMI
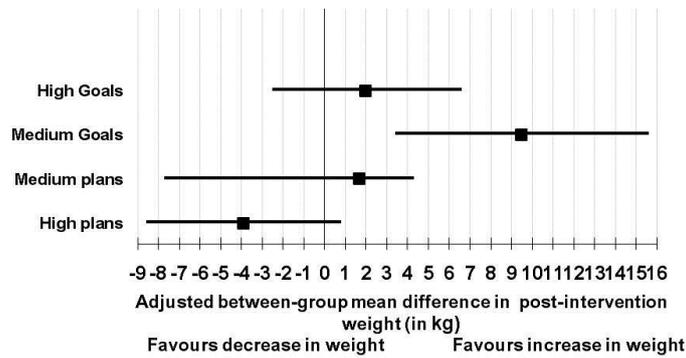
**Figure 30: 95% Confidence interval for categorised goals, plans and weight**

Linear regression was conducted to examine the association between total plans, total goals and weight and BMI at follow up.

There remains a potential association between high planners BMI and weight compared to low planners. Potentially those who make a high number of plans lose an average 1.1kg/m² (see Figure 29 and Appendix C6-2) for BMI and 3.9kg (see Figure 30 and Appendix C6-2) compared to those who make a low number of plans (-8.6, 0.8). Medium planners are more similar to low planners (adjusted estimate: 1.7kg, (-7.7, 4.3) -0.7 kg/m², (-2.7, 1.3)).

Their remains a statistically significant association difference in BMI and weight between medium goal setters and those who set no goals with medium goal setters having weight and BMI 9.5kg and 3.6 kg/m² higher than no goal setters.

Maintaining a weight loss
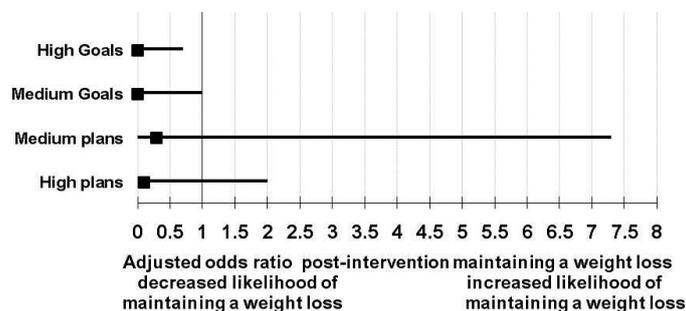
Figure 31: Odds ratio for categorised goals, plans and maintaining a weight loss

Logistic regression was conducted to examine the association between total goals and plans and maintaining a weight loss at follow up.

The association between trichotomised planning and weight loss maintenance remains the same as for continuously measure planning. High planners compared are potentially less likely to maintain a weight loss than low planners (see Figure 31 and Appendix C6-2).

There is a statistically significant association between high and medium goal setters and maintaining a weight loss. They are still less likely to maintain a weight loss compared to those who set no goals (see Figure 31 and Appendix C6-2).

Analysis on types of plans, commitment and specificity

Further analysis was conducted with the types of plans, commitment and specificity codes however due to the small sample size the models did not fit. Therefore conclusions from this analysis could not be drawn. The results however can be seen in Appendix C6-3.

Table 20: 95% Confidence intervals of results of plans and goals in relation to weight loss maintenance outcome

	BMI	95%	Weight	95%	Maintaining	95%
Goals separated model	0.2	-0.2, 0.6	-0.3	-0.5, 0.0	0.7	0.5, 1.2
Plans separated model	-0.1	-0.2,-0.0	0.5	-0.6,1.6	0.9	0.8, 1.0
Goals same model	0.3	-0.1, 0.9	0.8	-0.3, 2.0	0.7	0.5, 1.2
Plans same model	-0.1	-0.2, 0.0	-0.3	-0.6, 0.0	0.9	0.8, 1.0
High Goals- separate model trichotomised	1.0	-0.6, 2.6	2.0	-2.5, 6.6	0.0	0.0, 0.7
Medium Goals- separate model trichotomised	3.5	1.4, 5.6	8.8	2.7, 15	0.0	0.0, 1.0
High Plans - separate model trichotomised	-1.2	-3.2, 0.7	2.8	-8.0, 2.3	0.1	0.0, 2.0
Medium Plans - separate model trichotomised	-1	-3.2, 1.3	-2	-8.7, 4.7	0.3	0.0, 7.3
High Goals- trichotomised same model	1.2	-0.6, 2.9	3.4	-1.5, 8.3	0.0	0.0, 1.1
Medium Goals- trichotomised same model	3.6	1.4, 6.2	9.5	3.1, 16.5	0.0	0.0, 1.1
High Plans –trichotomised same model	-1.1	-3.1, 0.4	-3.9	-8.6, 0.8	0.2	0.0, 2.0
Medium Plans –trichotomised same model	-0.7	-2.7, 1.3	1.7	-7.7, 4.3	0.5	0.0, 6.7

Key	
	Statistically non-significant but skewed towards the positive or deceased likelihood
	Statistically non-significant but skewed towards the negative or increased likelihood
	Statistically significant
	Conclusions cannot be drawn

6.5 Discussion

The aim was to examine whether plans are associated with weight outcomes and whether plans would lead to an increase in weight loss compared to goals. The results from the continuous data suggest that the total number of plans that a participant makes is potentially associated with a decrease in weight and BMI. Goal setting on the other hand appears to be associated with an increase in weight and BMI, therefore it could be important that participants are guided to make plans during their MI sessions. Setting goals and planning appear to be possibly associated with a decreased likelihood of maintaining a weight loss. This result could be due to the maintaining a weight loss outcome being dichotomised. When a variable is dichotomised information is lost therefore power is lost to detect differences. It is expected that the continuous variable would show differences compared to the dichotomised variable. For example, if every planner gained a pound, and every non-planner gained two pounds, then no one would have maintained in either group (so no difference between groups) yet the difference in weights between the groups would be one pound. This could therefore explain the difference in results between weight, BMI and weight loss maintenance.

As indicated above high planners, potentially on average decrease their weight and BMI compared to low planners. This supports the previous research as two studies [122 123] incorporated implementation intentions into counselling interventions with both finding a statistically significant improvement on outcomes [122] (fruit and vegetable servings (p=0.04 [123]). Further studies have examined MI and planning and found a medium effect size for MI on action plans (d=0.42) [32]. An RCT [31] found the MI techniques condition led to more complete action plans and a longer duration of physical activities up to six months after discharge [31]. This study also adds further support for plans within MI as the plans occurred naturally within the session compared to previous studies which told the participants they must make these plans. Therefore unforced, natural occurring plans are also associated with outcome, which is in line with the principles of MI.

High goal setters potentially increase their BMI and weight compared to those who do not set any goals. Medium goal setters statistically increase both their BMI and weight. There is also an indication that both planners and goal setters potentially decrease their likelihood of maintaining a weight loss compared to low planners and no goal setters.

So the results from both the continuous and the categorical variables suggest that making goals were not associated with a decrease in weight. This is an unexpected finding but may not hold up in other/larger samples and it would be helpful for future studies to look at the interaction. It may also be important to make plans alongside goals and not set goals without thinking about a clear plan to achieve them. It may also be that goals are not specific enough (i.e. not as specific as plans) and therefore not sufficient. This was an unexpected result as it goes against research evidence suggesting that goal setting can help people change their behaviour [223 224]. However the evidence around planning does suggest that there is a long road between goal intentions and achieving them, as people need to deal with repeated interruptions and possible setbacks [110]. This may be that goals are probably necessary but not sufficient to lead to behavior change, i.e. plans are what you need to achieve your goal. This thesis was unable to examine this hypothesis as the current data could not fit an interaction term as the data does not allow for the plans to be linked to specific goals. This is a potential area for future research. The therapists in the study were encouraged to help the participant set both goals and plans therefore this did not affect the results. However there were less goals than plans made overall which could have reduced the statistical power to detect difference. Due to the lack of power to detect differences, these findings should be replicated in future analysis, however this Chapter has demonstrated the rich analyses that the planning tool makes possible. Further discussion of these results can be found in Chapter 8.

7. Chapter 7: Qualitative analysis of therapist skills

7.1 Introduction

The final phase of the thesis is presented in this Chapter, the aim of which is to examine the skills therapists use prior to eliciting planning talk from the clients. It aims to answer the question which skills do therapists use prior to electing planning from clients? In Chapter 6 the results suggested that planning may be associated with a decrease in weight and BMI. This demonstrated that there is a potential relationship between planning and outcome. One way to perhaps enhance the delivery of MI might, therefore, be to understand and explore the skills therapists used in the MI sessions which seemed to elicit discussion of these plans in clients, so that in training, MI practitioners could be taught to use these approaches.

Since the goal is to investigate which therapist skills occur prior to clients discussing a plan and whether the skills are different when no plans are discussed, this piece of work involved looking in detail at what skills the therapists used throughout the MI sessions. This Chapter will use the first person to demonstrate what I did to conduct the analysis.

There have been a number of tools developed to measure therapist behaviour within MI sessions. These tools are the MITI [28], the MISC [209] and SCOPE [186]. The therapist skills measured by these tools are: acceptance, empathy, MI spirit, advise, affirm, confront, direct, emphasise control, facilitate, giving information with or without permission, open and closed questions, raising concern and simple and complex reflections. These tools examine a number of MI therapist skills however they do not cover the full range of skills a therapist can use. For example double sided reflections, reframing and perception check. They also do not specify what aspects of the clients' behaviour they are affirming or exploring e.g. self-awareness or motivation. Therefore this is a limitation of these coding tools as they must simplify the behaviours that occur during an MI session to ensure consistency across coding. In addition, these tools were developed before the new planning stage was added to MI, therefore therapist skills in eliciting plans may not be captured sufficiently by these existing tools. The tools currently available to measure therapist behaviours may not capture all the skills that the therapists were using during these WLM MI sessions.

In order to explore therapist skills, qualitative analysis was considered a potentially useful as a method. Qualitative analysis uses inductive research methodologies that are concerned with theory generation and the exportation of people's meanings and experiences. It provides a more in-depth and rich description of data than quantitative research and it facilitates the development of codes and themes that are grounded in the data. The existing MI coding systems were considered to be limited in terms of exploring therapist skills in relation to planning because they would restrict the analyses to the pre-specified categories in the coding systems defined before planning became a part of MI. However qualitative methods facilitate exploration of the data to allow the themes to emerge from the data rather than pre-specifying them in advance using a more deductive approach. Therefore qualitative approaches seemed to offer the most potential to explore therapist's skills within the MI sessions.

There are a number of different qualitative analytic approaches including; thematic, conversational, discourse analysis and grounded theory which could potentially be used here. The different analytic techniques were assessed as to their suitability to answer the research question.

Conversational analysis is an approach to the study of natural conversation. The focus is on the interaction within the conversation, turn-taking, constructing sequences of utterances across turns, identifying and repairing problems, and employing gaze and movement. The analysis is always based on audio or visual recordings of interactions, which are carefully transcribed in detail [225]. Critical discourse analysis is a theoretical approach that examines the types of language used in society and its role. It is the linguistic analysis of spoken or written texts, which involves focus on the "signifiers that make up the text, the specific linguistic selections, their juxtapositioning, their sequencing and their layout" [226]. Grounded theory is used to develop theory that is developed inductively from the data. Open coding is used to analyse the data, this involves identifying, naming, categorising and describing what is found in the text.

In this study, the analysis of the therapist skills involved an open exploration of therapeutic techniques/skills perhaps associated with eliciting planning talk. This is not the fine detail of turn taking, nonverbal cues (conversational analysis), sequencing of text (discourse analysis) or developing theory at least at this stage (as per grounded theory). Thus grounded theory would not be appropriate as there are already identified

techniques/skills which we would wish to explore and therefore these codes/categories would not be inductively developed. As the question is focussing on the skills of the therapist it was felt that conversational and discourse analysis were not an appropriate method of analysis as I was not interested in the conversational constructs but rather the themes within the MI session. These other approaches would doubtless be useful in further work exploring this area, but this we feel is a good starting point. These approaches would add further depth and understanding to the conversation dynamic between the client and the therapist as it could lead to understanding the nuances that could prime planning. However what will add to therapist training and improve practice is an understanding of the therapist skills that prime planning as these are concrete and can be taught to therapists in a consistent manner. Therefore the detail gathered in these techniques may not be necessary to inform therapist training.

Thematic analysis involves "identifying, analysing and reporting patterns within data. It minimally organises and describes your data set in detail. However, frequently it goes further than this, and interprets various aspects of the research topic"[200]. This method was thought to be the most appropriate for the initial exploration of this issue and to address the research question. It allows themes to inductively emerge from the MI session data and the themes can also be based on the literature [201 202]. The therapists skills will be considered 'themes' which can be coded during the sessions, therefore new themes can be added leading to a deeper understanding of the data than the present MI coding tools can provide.

Two different approaches to thematic analyses exist; inductive and deductive. Inductive thematic analysis is used when there are no previous studies dealing with the phenomenon [201]. There have been studies [92 93] examining the therapist skills preceding change talk. They have found that MICO (MI consistent is defined as incorporating the following behaviors: advise with permission; affirm; emphasize control; open question; simple reflection; complex reflection; reframe; and support) increases the probability of the client using change talk. However only one [94] study has investigated therapist behaviours and planning. They examined the within session predictors of the clients decision to complete a change plan. They found that MICO behaviours significantly predicted the decision to complete a change plan. This study did not look at in-session planning that the client discusses with the MI therapist,

therefore therapist skills prior to planning is a new area of research that has not been investigated.

A deductive approach can be used if the aim of thematic analysis is to test previous theory in a different situation [201 202]. As stated, there have been studies looking at therapist behaviour and change talk. These studies have used various tools such as the MISC and the SCOPE to measure therapist skill. The aspects measured by these tools have therefore provided some of the potential themes for exploration within the sessions. However they do not cover all therapists' behaviours and it is important to also use an inductive approach to identify any other themes or therapist skills that seem to be occurring during the sessions. Combining both these approaches allowed for the coding framework to be as comprehensive as possible incorporating both the MI data from this study as the primary source as well as theory and findings from other studies.

7.2 Aims

The aim was to identify the skills that the MI therapist used prior to a plan being discussed by the client and to investigate if there are any differences in the skills used when no plans are discussed.

7.3 Methods

7.3.1 Sample

As stated in Chapter 1 15 therapists who had been trained in MI and had experience of using MI in practice, delivered the MI sessions. They all were educated to at least degree level or equivalent. The majority were female with only four being male.

There were 50 participants who had their MI sessions audio recorded. The participants were obese adults both men and women aged 18-70 years with current or previous BMI of 30+ who lost at least 5% body weight during the last 12 months and with independent verification of weight loss. This is described in Chapter 1.

7.3.2 Data

The data were obtained through the WILMA study as explained in Chapter 1. Fifty audio recorded face-to-face MI sessions about WLM derived from WILMA study participants (see Chapter 1). The session selection process is explained in Chapter 4.

7.3.3 Data analysis

Thematic analysis involves the search for and identification of common themes that can be seen across the whole data set [199]. Thematic analysis provides a rich, detailed and complex account of the data [200]. I used this method as it allowed me to explore and analyse the MI sessions in more detail with a wider range of therapist skills than those coded with existing tools.

Initially I used inductive thematic analysis of the MI data to identify different themes in order to develop the coding framework. I listened to audio recordings of two MI sessions and then read through the transcripts to identify emerging themes with regard to therapist behaviour. After identifying these themes using an inductive approach, I searched the literature and the MI coding tools to identify further therapist skills. From this process I developed a coding framework (See Appendix C7-1 and Table 21) that incorporated the themes from the analyses of transcripts as well as the themes identified in the literature search.

The coding framework (See Appendix C7-1 and Table 21) was then applied to the transcripts of the 50 MI sessions that already had plans identified in them via the planning talk coding system. I used the coding framework to code the therapist skills that occurred both prior to the identified plans, and when no planning was discussed. The initial framework was based on the analysis of two MI sessions therefore the themes were flexible and subject to change. If new themes emerged as I was coding the MI sessions these were added to the framework and previous sessions were re-coded with the new framework. This process of coding the data continued until all the data had been coded.

The thematic analysis of the data involved assigning Sections of text data with different themes and double coding 10% to test reliability. NVivo 10 was used to assist with the coding, reliability testing and storage of the qualitative data.

The transcriptions of each MI session were imported into NVivo 10. All the themes from the thematic framework were input into the software to allow me to assign themes to the data. I read the transcripts in NVivo while listening to the audio recording and coding the MI session. If any new themes emerged from the data they were added to the

framework within NVivo. I coded all 50 sessions the using the thematic framework. As mentioned in Chapter 4 NVivo can be used for many different purposes and this Thesis did not use all of these features but focused on those felt necessary for the task.

As mentioned in Chapter 5 NVivo is capable of storing data in themes therefore allowing the researcher to look at all the data coded under different themes. I used this to review themes and the coded data to explore the skills the counsellors were using at different points within the MI sessions.

NVivo can also run a percentage agreement to test for reliability between two coders. I used this function to test the reliability of my coding with a second coder.

Once the coding of all 50 sessions was completed the most frequent codes that occurred prior to planning and when no planning talk occurred were examined. The codes were compared to see which codes occurred prior to planning and which occurred when there was no planning talk to see if there was a difference in the codes. This therefore takes a more positivist approach.

7.3.4 Inter-coder reliability.

As mentioned in Chapter 4 inter-coder reliability is a method to ensure scientific rigour in qualitative analysis. This refers to more than one coder independently classifying material in the same way as the initial coder. It is commonly used in qualitative research as a measure for improving reliability [218].

Inter-coder reliability was used to assess the reliability of my coding of the data. Once I had coded all the MI sessions a random selection of 10% were given to a second coder. They independently coded this data. Any themes were there was more than a 5% disagreement, as calculated by NVivo 10, where discussed by both coders in order to resolve the disagreement and to refine the coding system if required.

7.4 Results

7.4.1 Inter-coder reliability

Disagreement was due to a misinterpretation of the exploration code by the second coder and of the transcript due to chunking issues and simple reflections being

transcribed as questions. Therefore it was found that there were no changes required of the coding framework.

7.4.2 Therapist skills and planning

Four main themes emerged from the analysis of the therapist's skills prior to planning and when no planning occurred: (1) Affirm; (2) Exploration; (3) Questions; and (4) Reflections (see Table 21). However within these themes different subthemes emerged for planning and non-planning. These themes will be described in detail in this Section. Initially the therapist skills used prior to instances of planning will be discussed then the therapist skills used when no planning occurred. Quotes from the transcribed MI session will be included to illustrate each theme or skill.

Table 21: Coding framework

Top level node	Sub-node 1	Sub-node 2
Reflections	Perception check	
	Reflecting negative statements	
	Complex reflections	Amplified reflection
		Simple reflection
		Double sided reflection
		Reframing
Questions	Direct planning or goal setting	
	Leading question with intention to give information	
	Closed question	
	Open question	
	Evoking positive feeling/ language	
Summary	Past achievements	
	Summary of session	
	Summary of previous sessions topics	
Exploration	Asking client to expand on their ideas	
	Exploring clients self-awareness	
	Exploring plan ideas or how a plan would look without clients commitment to it	
	Exploring motivation or reason for change	
	Exploring clients feelings	
	Facilitators	
	obstacles	
	Exploring past situations	
	Pros and cons	
Information	Giving information with	

	permission	
	Giving information without permission	
	Questions designed to gather information about the client	
Desire/ action	Exploring clients desires	
	How can client change desires into action	
Affirm	Affirming clients motivation	
	Affirming clients self-awareness	
	Affirming and focusing on positive action	
Importance scale	Importance scale	
Talk not related to WLM	Talk not related to WLM	
Rolling with resistance	Rolling with resistance	
Space to tell story	Space to tell story	
Empathy	Empathy	
MI inconsistent behaviour	MI inconsistent behaviour	

7.4.3 Planning

The skills that seem to be associated with eliciting planning talk will be discussed below.

7.4.3.1 Affirm

One of the main themes that emerged was that the therapist would affirm their client's motivation and the positive actions they had taken. The therapist is actively listening for the client's positive actions and motivation and reflecting this in a positive manner.

Positive action

Therapist: "Ok so you're you're making an awful lot of effort."

Client: "Yes. The only thing I can say, is that I can …"

Therapist: "and you're continuing to make that effort"

Client: "to continue it, you know, to keep on because it is a long haul."

Therapist: "It is a long haul."

Client: "That's the only thing at the moment I really want to do, is to keep on. Not to get any bigger at all." [PID 0036]

Therapist: "But it sounds like you were really good, as you said, when you could make good choices for yourself and stick to your Slimming World, you did make good choices"

Client: "I think that's what I've learned over the last fifteen months…You know? Uuh and where probably I failed before because it wasn't sort of tattooed on my brain" [PID 0046]

Motivation

Therapist: "Okay so the eating pattern that you've got at the moment that's working for you. You're going to stick to that and then it's going to be the, the doing more, the gym, which will use more ..."

Client: "I'll reduce alcohol intake. So five or six glasses of wine a week down to two or three hopefully." [PID 0368]

Therapist: "You sound like you've got very good in-built processes for kind of monitoring and saying "No" and there's very little actually by the sounds of things that could actually shake that."

Client: "You know, one of the things I'm very well aware of that, you know, in the future it's going to be me and therefore my health has got to be paramount and not allowing myself to get overweight again." [PID 0626]

Affirming the client's positive action and motivation allows the therapist to build rapport with the client. It adds to the client's confidence that they can change their behaviour which could be important for behaviour change.

7.4.3.2 Exploration

Self-awareness

Another theme is exploration, in particular exploring the client's self-awareness. This involves looking in detail at aspects of the client's life and working with them to understand why they behave in a certain way. In this context it was often used to help clients become aware of why they were eating at certain time points, for example was the client feeling bored or if they were comfort eating. Exploring self-awareness also involved self-monitoring either by weighing or food diaries. This allowed the client to become aware of what effect different calories have on their body.

Therapist: "So you've found yourself rewarding yourself even with good food almost the 'I've got through a good day, I've done <u>well</u> and now I deserve a treat, even though you're thinking it it's a good treat, it's not a <u>bad</u> treat that you're treating yourself"

Client: "No. It's not just a treat, it's just I need to get this thing in my head well I need to eat but I don't need the treat..." [PID 2101]

Therapist: "Something is different? Yes, something is different for you this time."

Client: "Yeah, I do, I feel it's clicked like and when I get on the scales, I don't think "Oh, this is the weight I am, is it good or bad now?" I just get on the scales and I think "Oh, right, well that's what it is now, you know, it'll be different next week, it's moving.""

Therapist: "Ok, so you're not sort of judging yourself where you are?" [PID 0355]

Both of these quotes demonstrate that the client is monitoring their weight or becoming aware they need to monitor their food intake. Monitoring one's food intake and weight can help people lose weight and maintain weight loss as it builds the person's self-awareness of their eating habits and their weight. This allows them to identify areas which could be improved.

Expanding on the client's ideas

Another subtheme of exploration was the therapist asking the client to explore their ideas further and expand on them. The therapist identified that the client had talked about an area they could change to improve their weight loss or WLM. The therapist would then ask the client to add more details to this leading to the formation of a more detailed plan.

Therapist: "So you've become a little bit more um active in the process by the sounds of it. So what might help you get a little bit more focussed and active in that way?"

Client: "I think probably the whole writing stuff down, I think."

Therapist: "Tell me a bit about that, how does that work?"

Client: "Um, so again if you write down what you, I mean, you can plan what you're going to eat so you can always plan out your what your free food

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before you eat it and that's what I used to do, I used to do that a lot at the start" [PID 0028]

Therapist: "So this this eight pounds, you've mentioned it before and you said other people talk about it. What, what other thoughts about this last half stone"

Client: "I think you've just got to tighten up for a few weeks and cut down on my portion sizes and do it." [PID 0046]

Encouraging the client to make more detailed and therefore specific plans can lead to an improvement in outcomes. The therapists in these quotes were encouraging expansion of the client's ideas which in turn encouraged the clients to set specific plans. The therapist asked the clients to expand on where, when or how their plan might take place.

7.4.3.3 Questions

Direct planning question

Aside from reflections, the therapist asking the client a planning type question was the most common theme that emerged prior to the client making a plan. This is in line with the recommendations made by Miller and Rollnick [227] for therapists when eliciting planning talk from the client. They suggest using a key question which asks the client, "So what's next?" The key question does not ask for the client to commit to any plan as this may evoke defensiveness. Open questions are advised compared to closed questions. Examples of key questions are; "So what do you think you'll do? So where does all this leave you? and I wonder what you might decide to do" [227].

Therapist: "Weren't we? And obviously you've gone away and thought about that and you decided right ok I'm going to test it out. So that's fantastic. Well done and what you've noticed is how hooked you are really. What do you think you're going to do with weighing now in the future then?"

Client: "I think it goes back to if I was more in control of what I was eating, then I think I could be quite confident that I know what this girl's saying……I don't know. I think for the moment, I'd want to go back to weighing. Maybe it's something then that as I get to target, when I actually hit the target and say, ok, well if I am a couple of pounds either side then that'll be fine." [PID 0028]

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Therapist: "So how do you how do you think you're going to be able to get back on track once this crazy period's over then?"

Client: "Once I get back from Italy, you mean?"

Therapist: "Yeah, how do you think you'll be able to …?"

Client: "I'm really looking forward to it because I'm looking forward to getting back to normal. I'm looking forward to you know sort of ((coughs)) you sort of um ((coughs)) I have a schedule to get back to and I'm looking forward to picking up things that I've found along the way like the smoothie." [PID 0032]

Therapist: "What do you feel about the weighing scales, what, having talked about it? What do you want to do about that?"

Client: "I do feel like I <u>do</u> want to stop weighing on them and it has been a thing, exactly what you say about getting to target, it's been an obsession." [PID 0045]

These direct questions help to guide the conversation towards plans to change behavior. They prompt the client to think about what the next step is and how they can change their behaviour. It guides the client into the next stage of MI, which is planning.

7.4.3.4 Reflections

In line with MI recommendations complex reflections were one of the most common skills used by the therapist, used on more occasions than simple reflections. To achieve therapist competency as rated by the MITI the therapist must use a total of at least 50% complex reflections when compared with the total number of reflections. However simple reflections were also a common theme within the MI sessions. Reflections allow the therapist to show that they are actively listening to the client and understanding where the client is coming from. A simple reflection is a repeat or rephrase of what the client has said. A complex reflection adds deeper meaning to what the client has just said. It "adds some meaning or emphasis to what the person has said, making a guess about the unspoken content or what might come next" [227]. The therapists used both complex and simple reflections to elicit plans however complex reflections were used more often.

Complex

Therapist: "Yeah, and you're somebody who likes to plan things. So may be slotting something else in short notice isn't particular good for you, it doesn't kind of work for you particularly well. Yeah so routine is, I think I remember you saying it's quite important to you?"

Client: "Yeah, more so than I probably even realise."

Therapist: "Yeah, that's interesting, because it's important your own ways of doing things because that's what is going to help you isn't it?"

Client: "Erm ... I think if I just make a decision now, or today and just say right I'm going to do it (exercise) then it will probably happen because what I'll do is I will put my bag ready and I'll take it with me to work and the decision is made when the bag is in the car" [PID 0077]

Therapist: "Hmm it's, from what you're saying, it's kind of looking at food as a fuel, as opposed to being a hobby within itself. Rather than, whilst yes, enjoying the food that you eat but rather than hunting down the food, when you're hungry, that's when you eat the food that you enjoy"

Client: "and often you can be thirsty. I think I don't eat, drink enough liquids. You know? and uh I think often you're not hungry, you just want to drink, you know?"

Therapist: "But you eat instead of drinking?"

Client: "Yeah, yeah, but now I'm thinking there's glasses around the place… if I'm out the kitchen... you know, and then "Oh, I'll take one upstairs" and things like that, you know? but um I think that's a got a lot to doing…" [PID 0075]

Simple reflection

Therapist: "So there's something about keeping active in in at that time...?"

Client: "I need to get the knitting needles out, yeah."

Therapist: "What are your thoughts on that?"

Client: "Yeah, I know, I'll look for them cos reading, I love reading but if I'm reading, I'll go, I can go and grab something so that's not gonna help me stop me eating but the laptop and I know the knitting will cos I think, cos I'm using my hands, you see." [PID 0014]

Therapist: "Yes, ok so right, so you're hoping you can keep up your healthy eating when you're in Italy."

Client: "Yes, yes. Um and try and avoid those pasta well it's going to be difficult but um cos you know the pasta thing, you know they're not going to be, cos I eat um wheat free pasta but I'm not going to be I'm not going to be so fussy about that but I'll try to keep on the risotto rather than the pasta." [PID 0032]

Therapist: "So shopping, is that quite important as part of that…?"

Client: "I can't shop every day. I find it difficult to shop every day, so my husband comes with me. We go once a week and I will do my main shop once a week. I'll get lots of fresh food in and then he will go out and get bits and pieces through the week for me, you know. Um but I find it, I find it easier to plan my meals and then write my shopping list." [PID 0060]

Prior to planning there were more occurrences of complex than simple reflections. This is therefore in compliance with the MITI recommendations for proficient MI practice which should lead to behaviour change. The finding that this ratio occurs during pre-planning demonstrates that using more complex reflections can lead to more planning occurring from the clients.

7.4.4 Non planning

The themes that seemed to be associated with non-planning talk are discussed below.

7.4.4.1 Affirm

Affirming is also a common theme that occurs throughout the MI sessions when there are no plans being made by the client. The therapist is highlighting and bringing the clients attention to the positive aspects that the client has talked about.

Positive action

Therapist: "So it's a real change in kind of how you're viewing food, isn't it, because it's that kind of food as fuel, food as medicine, you know, it's a very different …"

Client: "That's right…"

Therapist: "it's a very different …"

Client: "It's because, because, I usually have about one and a half Weetabix. So I ate that and I went up and had a shower and I thought, "I don't feel right", so I went down and I made a piece of toast …" [PID 0012]

Therapist: "Ok so you did what you planned to do, what, by the sounds of it, apart from you feel like you've lost a bit of control with the chocolate. But you didn't get back down to that 10 stone one that you wanted but it's very close, you know. You <u>did</u> maintain, you know, this is, you know, that's fantastic, isn't it, to be able to maintain weight like that? That's still an achievement."

Client: "When I was big, bigger or at my biggest, I could think about it all the time, "If only I could be slim". [PID 0045]

Motivation

Therapist: "That's been a really fantastic chart as it were yeah and you just are determined that you're not going to go back and spoil the nice chart"

Client: "But that's a good thing for me to have that in my head for the next week or two weeks yeah." [PID 0043]

Therapist: "Yeah so it's a real statement, you know, I'm me, I've got a bit of time now and I can focus on myself and have you noticed anything else apart from high energy which is really helpful, anything else?"

Client: "Yes people have said to me they have noticed the difference and that makes me feel good. Even going back to back to school after weeks people noticed that I have lost some weight over the holidays and said how good I looked."   [PID 0072]

Aside from reflections this was the most common theme that occurred when the clients were not talking about planning. Again this therapist skill is being used to improve the client's confidence. However within this client group they have already changed their behaviour to some degree and have succeeded in losing weight. This situation seems to lead to a high frequency of affirming positive action and motivation. With such a high frequency it may also be used by the therapist to engage the client. Affirming is still an important skill to improve the client's self-efficacy but may not always lead to a plan being talked about.

7.4.4.2 Exploration

Feelings

The British Association for Counselling and Psychotherapy define therapy as "a time set aside by you and the therapist to look at what has brought you to therapy. This might include talking about life events, (past and present), feelings, emotions, relationships, ways of thinking and patterns of behaviour" [228]. Exploring a client's feelings is therefore one of the key aspects of therapy leading to it being a common theme within the MI sessions. As previously stated a person's emotions can be linked to their eating [229-231] therefore it was an important area for the therapist to explore with their client.

Therapist: "So [name] how have you been holding up through this time because it sounds as though you're the one who's really been holding the fort. You know you, you've described that earlier. You said your wife and your daughter went, um, and had a break and you've been sort of back here I suppose dealing with the things that have needed to be taken care of. So how are, how are you getting on with that and how are you feeling about all of that?"

Client: "Well it's the same thing I've mentioned to you last week when we briefly talked. Where I hadn't had a weakness for getting on for months. I suddenly had one and one that lasted probably one of the longest ones I've ever had; four or five days."
[PID 0619]

Therapist: "If you were to tackle them (health issues), would these things ease? Is it a bit of a chicken and egg situation because you've got them, it's upsetting and you want to eat more but <u>actually</u> that makes them worse?"

Client: "I mean, like obviously on a confidence level and self-esteem, I do that in any way. I but when bad things happen, then I just still do ((unclear)) to eat…" [PID 0611]

The therapists during the MI sessions were aware that the client's emotions can be linked to their eating as demonstrated in the quotes. Addressing these emotional issues within the MI session could have an impact on the clients' weight loss/ WLM due to less emotional eating. It is an important aspect for the therapist to explore however it

does not often lead to the client talking about a plan but could still impact upon the client's weight.

Self-awareness

Self-awareness was also a common theme within the non-planning aspects of the MI sessions. As previously demonstrated it is an important area for the therapist to address as it could be linked to improved outcomes [46 52 232-234]. Exploring self-awareness involves helping the client to become aware of their behaviour.

Therapist: "Yes, it's finding a way of sort of making your personality work for you rather than feeling like you've somehow got to work against that and change that part of yourself, just recognising that that's part of who you are. You're making that work for you, saying the all days (adhering to the diet) are going to be the all days and the nothing days (not adhering to the diet) are going to be the nothing days and that's how it's going to be."

Client: "Yeah and I think that was, that's been the biggest help to me, and I think that has helped me lose the pound and the pound and a half. Because it was just um I didn't think I'd lost a pound and a half. I thought I'd lost half a pound." [PID 0062]

Therapist: "Is that part of your pattern for binge eating when you feeling down or when something you experience?"

Client: "I certainly, you know, I'm certainly have a self-awareness that I use food in, my relationship with food is not what it should be. Erm and you know, I use and always have used food as a replacement for something else so I think there's definitely a definitely sort of, I suppose if you want to put it very very crudely you feel empty of something to try and fill it up with food. Now you know what that emptiness comes down to its probably, is probably the subject of a considerably larger number of counselling sessions." [PID 0069]

The therapists were working with their clients to explore their self-awareness during both the planning and non-planning parts of the MI sessions. Exploring self-awareness may not always lead to the client talking about planning because it might be that the client becomes aware of an aspect of themselves that they do not need to change. Rather

the client needs to accept this aspect of themselves not necessarily leading to a plan to change behaviour. This is illustrated in the quote above from 0062. It could also be that the client needs time to work on their self-awareness and they need time to process what they have explored with their therapist. Therefore, they may not be ready at that time to make a plan.

Motivation

Increasing motivation is one of the key aspects of MI. Miller and Rollnick state that "MI involves a collaborative partnership with clients, a respectful evoking of their own motivation and wisdom" [227]. Exploring motivation was one of the common therapist skills that were used prior to where the clients were not talking about planning. Therapists were evoking and exploring what it was that was driving the clients to change their behaviour.

Therapist: "Yes, so that's a very kind of strong feeling in you, isn't it?"
Client: "Yeah, yes."
Therapist: "That your health is paramount."
Client: "Oh yes. Yeah, particularly when you know you're facing hopefully a fair number of years, possibly on your own that, you know, you've got yourself to look after." [PID 0626]

Therapist: "So when you're outside you're happy, that's where you're …"
Client: "Well, yeah."
Therapist: "So these walks sound like they'll be just the right thing for you when … when the weather's…"
Client: "When we had the dog, years ago, and I used to take him up." [PID 2705]

Exploring the motivation with the client may highlight to them the reasons why they may want to change their behaviour and assess whether they feel ready to change. However, the client may not be at the stage where they are ready to change or to make plans.

7.4.4.3 Questions

Questions designed to gather information

The therapist used questions to gather information about the client's situation. This allowed the therapist to have a better understanding of the clients past and present situations.

Therapist: "So how did it start? Do you remember?"

Client: "As we unpacked, as the shopping went in the car, I was starting to open a packet of, um I'm trying to think what it was, I don't know, cereal bars. By the time we had got home, I'd eaten two. And then as we were unpacking the stuff for putting the shopping away, um I had a, again it's not a huge amount but I had a Danish pastry, which is um my partner had bought them." [PID 0028]

Therapist: "Do you still plot it now, your Slimming World weights?"

Client: "I did and then I stopped because when it got to nine thirteen and I was really excited and then I stopped because the target was ten and you got a target line on there and I couldn't bear to put ten one or ten two on there because it would go over this line and it was a visual thing and it is not, doesn't change anything." [PID 0045]

Therapist: "Cos you are not somebody who eats a lot of processed food, are you? Or?"

Client: "No."

Therapist: "No"

Client: "Very little."

Therapist: "So you tend to kind of start from scratch as it were."

Client: "Well, we, you know, I was brought up and we always cooked from fresh and uh I've always done it." [PID 0064]

These questions could be either closed or open questions. The questions give the therapist a better understanding of what the client's situation is. It can also help them to understand what the client's present diet and exercise habits are. These questions were designed to gather information however did not often lead to a client making a plan. These types of questions did not appear to be used by therapists for this function.

Open questions

MI uses open questions to engage and focus with the client. They help the therapist to understand the client's internal frame of reference. They also strengthen the collaborative relationship between the therapist and the client. Open ended questions are questions that do not lead to yes/ no answer, they facilitate exploration [227].

Therapist: "Yeah, when you hear it, what's your first kind of thought or image when you hear the word physical activity or exercise?" [PID 2103]

Client: "Well yeah gym comes to mind doesn't it? It's always the kind of hard end of sport."

Therapist: "Yeah, like being in a tracksuit and running around on a….Yeah, I think that's a common response, it's that kind of oh my goodness that seems like that's, for other people, that's something over there."

Therapist: "We've got … I … I'm … sorry that our time together is quite limited [Name of Client], we've got the two sessions, well a little bit of time today, and I wonder what you'd like to focus on?"

Client: "I don't know to be honest." [PID 0648]

Therapist: "How are you getting on with Weight Watchers?"

Client: "Um, well I haven't been for a couple weeks." [PID 0631]

The therapists used the open questions to guide the session and to explore the client's diet and physical activity. These open questions allow the therapist to focus the conversation but still allow the client to lead the MI session. These open questions do not appear to lead to clients talking about planning. These open questions could also be direct planning questions however under this thematic coding the direct planning questions have been separately identified.

7.4.4.4 Reflections

Both complex and simple reflections are the most common themes occurring during the non-planning Sections of the MI sessions. As previously mentioned the MI therapist is advised to use at least 50% complex reflections out of the total number of reflections used within the MI session. However when examining the reflections used when no

plans are occurring they tend to be simpler than the reflections used prior to planning talk.

Simple reflections

Therapist: "So you're not really missing it"

Client: "I sometimes, I think, I mean my sister, cos my sister used to drink Bacardi and coke and I used to drink whiskey and coke and when we were with them at the weekend, she's still drinking vast amounts and I did think, "(Christ) yes, that's how much I used to drink," you know?" [PID 0036]

Therapist: "So you feel you were eating the same for breakfast most days."   [PID 0028]

Client: "Yes, I think uh and even lunch to a certain extent, it tends to be a jacket potato or a salad or whatever um but (unclear) it's still this when you've eaten at seven o'clock and then you eat at twelve, it's what do I then eat in between."

During the non-planning talk there was a higher ratio of simple reflections to complex reflections, this is the opposite of what was found where planning talk was elicited. In this data set the simple reflections before planning reflect change talk however the simple reflections before non-planning do not reflect this.

7.5 Discussion

The aim of this Chapter was to identify the skills that the MI therapists use prior to a plan being discussed by the client and to investigate if there are any differences in the skills used when no plans are discussed. Four main themes emerged from the analysis of therapist's skills prior to planning and when no planning occurred: (1) Affirm; (2) Exploration; (3) Questions; and (4) Reflections. However within these key themes different subthemes emerged for planning and non-planning. The themes that emerged from the analysis were different from the MITI, MISC and SCOPE although there were some similarities. The existing MI coding systems do measure simple and complex reflections and open questions which did emerge as themes within the data analysed here. However many of the other themes such as exploration of feelings, self-awareness, motivation and expanding on clients' ideas and direct planning questions are not coded under the existing MI coding systems. The existing systems also do not identify what

the therapist affirms such as motivation, positive action and self-awareness, just that the therapist had affirmed the client. Therefore the themes that have emerged from this analysis have added a greater depth of understanding of the skills that therapists use within MI. It has also allowed new skills that are directly related to planning and which have not been included in previous MI coding systems to be identified and related to planning talk.

Asking planning specific questions and asking the client to expand on their ideas were two themes that occurred often prior to planning talk. Asking planning questions is in line with the recommendations made by Miller and Rollnick [227] for therapists when eliciting planning talk from the client. They suggest using a key question which asks the client, So what's next? Using planning within counselling has been supported by studies [122 123] incorporating implementation intentions into counselling. They found that those who developed a plan during counselling had improved outcomes compared to those who did not develop a plan. A further study [31] found an MI intervention generated more complete action plans than the self-administered planning sheet group and action planning statistically significantly predicted exercise at T3 (2 weeks follow up) (d=0.30 p=<0.001), T4 (4 weeks follow up) (d=0.30 p=<0.001), and T5 (6 months follow up) (d=0.31 p=<0.001).

The results of the current study indicate that these key questions or planning questions may lead to plans being made by the clients. It is however, important for the therapist to listen for signs that the client is ready to make a plan. If the client is not ready to make a plan then this technique will not be successful. Miller and Rollnick [227] suggest that the therapist listen for increased change talk, diminished sustain talk, that the client has already started to make changes, the client is envisaging what change may look like and is asking questions about change. If the therapist misjudges the client's readiness to make a plan it can lead to the client resisting change. Asking the client to expand on their ideas also led to clients talking about planning and possibly led to more specific plans. As mentioned within Chapter 2 implementation intentions are associated with an improvement in outcomes. They consist of a plan which specifies where, when and how the goal will be achieved. A meta-analysis [128] found that there was a medium to large effect size (d= .65) association between implementation intentions and goal achievement. Implementation intentions are more effective when they are made specific to a behaviour change [130]. Therefore the more specific a plan is the more likely it is to

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be associated with behaviour change. In the current study the therapists were encouraging expansion of the client's ideas which in turn led to increasingly specific plans.

There were common themes that occurred when plans were not discussed by the client. These were exploring feelings and motivation, questions to gather information and open questions. Exploring the client's feelings was addressed as the therapist recognised that the client's feelings could be linked to their eating. Working through the emotions during the sessions could prevent future emotional eating and impact on the client's weight loss/ WLM without the client necessarily having to make a plan. Exploring the client's motivation has been demonstrated to be a part of MI that could affect outcomes [152 154 162 181]. One RCT [152] investigating MI found that autonomous and controlled motivation were statistically significantly related to an increase in fruit and vegetable consumption. It is therefore an important area for therapists to explore as it helps people change their behavior and this motivation could help people to develop and enact plans. However, the results of this current work do not seem to suggest that exploring motivation with clients leads to them making plans at least directly after. This may be because there is a step between increasing motivation and making a plan. The client may need to identify areas of change before they make a plan.

The therapists used questions to gather information to give them a better understanding of the client's situation. They do not seem to be used by the therapist for the function of eliciting plans, other than the planning specific questions discussed above. The therapists in the MI sessions used the open questions to guide the session and to focus on the client's diet and physical activity. These open questions do not lead to the client talking about planning and this finding is supported by other research [97] where open questions are more likely to be followed by neutral talk.

In both situations–either prior to planning or when no plans occurred- the therapists affirmed both positive action and motivation. This helps to improve the client's confidence that they can change their behaviour and make them feel that people are noticing their efforts. This links to improving the client's self-efficacy [235]. Some clients may find it difficult to believe that they can be successful at changing their behaviour or maintain behavioural change. In order to improve self-efficacy the therapist needs to elicit and support hope, optimism, and the belief that change can be

accomplished, as well as reinforce experiences of success and give positive feedback [236]. Therefore by affirming the client's behaviours this could improve their self-efficacy. Self-efficacy has been identified as being important for behaviour change [236]. Bandura developed a theoretical framework to explain self-efficacy's role in behaviour change. It is a function of peoples expectation about what will happen if they start a behaviour and their ability to engage with the behaviour change [236]. A conceptual review found that self-efficacy is associated with weight loss maintenance [46]. Therefore the therapist affirming the client could help improve the client's self-efficacy, which may lead to the client feeling able to make plans and carry them out. Affirming also occurred when no plans were mentioned. The clients within the WILMA study had already changed their behaviour as they had succeeded in losing weight, which may mean that they were quite motivated as they had already put positive actions in place and been successful. This may have led to a high frequency of affirming by the therapists. It may also be that affirming does not necessarily lead to planning talk but may be important for other reasons including to engage clients. Affirmation is likely to be an important skill for enhancing the client's self-efficacy but may not always lead to planning talk.

Another theme that emerged was exploring self-awareness both prior to planning and when no plans occurred. Studies [46 52 232 233] have found that monitoring one's food intake can help people lose weight and maintain weight loss. It builds the person's self-awareness of their eating habits and allows them to identify areas which could be improved. Research has also indicated that people who monitor their weight either at home or at a slimming club are more likely to maintain their weight loss [46 234]. Both these monitoring techniques improve the person's self-awareness therefore exploring this within the MI session is important as it can highlight areas which could be improved which may then lead to planning. It is also important for the client to understand how their emotions may be linked to their eating. This can be done by exploring the client's self-awareness of their eating. Studies [229-231 237] have recognised eating is a coping mechanism for alleviating and dealing with stress and emotions by either undereating or overeating. When the therapist investigates this link with their client this could lead to recognition by the client that there is an emotional link to food, e.g. rewarding themselves, which could then lead to the client making a plan to change that behaviour. Exploring self-awareness does not always lead to the client talking about planning as it was also a common theme in the non-planning

Sections. It might be that the client becomes aware of an aspect of themselves that they need to accept rather than change. It could also be that the client needs time to work on their self-awareness and they need time to process what they have explored with their therapist. Therefore, they may not be ready at that time to make a plan.

The therapist's use of complex and simple reflections was common prior to planning and non-planning talk. To achieve therapist competency as rated by the MITI the therapist must use a total of at least 50% complex reflections when compared with the total number of reflections. When examining the complex reflections and simple reflections it was found that a larger number of complex over simple reflections were used prior to planning talk and the opposite occurred when no plans were talked about. There is support from other studies that complex reflections are strongly related to change talk [88 97]. However it has also been found that when therapists use a larger number of simple reflections are associated with increased drinking [96]. Therefore it may be important to use complex reflections more often rather than simple reflections to increase change talk and planning. When investigating content of the simple reflections, a difference was noted between the simple reflections the therapist used before planning talk and non-planning talk. The simple reflections used by the therapist before planning reflected the clients change talk. However, the simple reflections that the therapist used during non-planning did not pick up on change talk. It could be that the simple reflections need to reflect change talk to increase the likelihood it will be followed by the client discussing a plan.

In conclusion four main themes emerged from the exploratory analysis of therapist's skills prior to planning and when no planning occurred: (1) Affirm; (2) Exploration; (3) Questions; and (4) Reflections. The different subthemes that occurred only prior to planning were direct planning questions and expanding the clients ideas. The other themes either occurred both before planning talk and non-planning talk or just prior to non-planning talk. Therefore it could be important for therapists to ask direct planning questions and encourage their clients to expand on their ideas if they want their clients to make plans. Many of the themes that emerged from the data are skills that MIPs are routinely advised to use in their MI sessions so they are going to occur prior to plans and also non-plans talk. However the results do suggest that there are differences between the occurrences of these themes which differentiate the skills used before planning and non-planning talk. These differences in therapist skills have been

identified by this analysis which can be further investigated. All skills identified could be linked to planning in further analysis using regression analysis. There are likely also to be other processes occurring within the MI session that increase the likelihood that clients will make plans. It may be more about the nature or content of the conversation rather than (or in addition to) therapist skills. It could be that it is due to the therapist sensing the client is ready to make a plan and using certain skills to elicit planning from the client. Therefore, future research is needed to analyse MI session data using conversational analysis or discourse analysis to get a deeper understanding of the processes occurring within the sessions. This is supported by Claire Lane's DClin thesis as she states that there was a "diversity of function within categories of client and practitioner speech." P2 [238]. Therefore there was many ways in which the therapist for example used affirming. This supports the idea that more research needs to be conducted to understand the MI process.

8. Chapter 8: Discussion

8.1 Summary of literature & research questions'

Obesity is a key public health issue and changing behaviours related to weight is an important focus for health improvement. Research has indicated that there is a gap between people's intentions to change their behaviour and actually succeeding in changing their behaviour [34]. Theories such as the TPB, HAPA and Rubicon Model of Action Phases have suggested that planning could bridge that gap. As discussed in Chapters 1 and 2, within behaviour change research, planning takes many forms such as action planning, coping planning and implementation intentions. We know from behaviour change research that planning in the form of action or coping planning or implementation intentions facilitates behaviour change [31-33 125 126 129 130 132]. People also set goals in order to change their behaviour. Within the TPB, HAPA and Rubicon Model of Action Phases plans help people to achieve their goals. People must set goals first and then make plans. Goal setting theory was developed inductively over 4 decades based on empirical research and is based on the premise that consciousness affects goals [112]. It has been found that specific and hard goals lead to a better level of task performance compared to easy or vague goals [114]. These findings overlap with the planning literature as within the HAPA people must make action plans (specific plans) to achieve their goals.

MI is a counselling approach designed to promote behaviour change and it has been shown to be effective in a wide range of behaviour change contexts including weight loss [12 14 82]. The studies included within the reviews [12 82] vary in the number of MI sessions given, ranging from 1 to 8 sessions and in the type of training received, which ranged from no specified training to 6 days of training. Many of the studies throughout the reviews did not assess fidelity using the MITI. They did however provide supervision to the therapists. About a quarter of studies included in the reviews had a samples size of 60 or below so could have been underpowered. There were also some studies that included all females/a majority of female participants and therefore under-representatedmen. Although there are methodological issues the reviews all demonstrate that MI can be effective in helping people with weight loss in a general medical care setting as well as a more specialised counselling setting. To date however there is uncertainty about which mechanisms underlie the efficacy of MI. There is a lack

of evidence for specific "active ingredients" that may account for its efficacy within behaviour change [21 26]. Planning is a recently added stage to the MI process and this may have an important role in behaviour change within MI. It is important to understand how MI works as this could lead to improvements in practice and client outcomes, focus research efforts and facilitate a better understanding of what helps people to change behaviour[27].

The systematic review in Chapter 3 identified a potential pathway by which MI could influence health behaviour outcomes which is in line with that already outlined in the addictions field [88]. It involves a causal chain whereby therapist behaviours (specifically MI spirit which is based on three key elements: collaboration, evoking the client's ideas about change and autonomy) positively influence client change talk and change talk is linked to improvements in health outcomes. The review also found evidence that MI can increase planning and planning can lead to behaviour change [31 32] suggesting that planning could be a mechanism of MI. There were however limitations to the review it terms of sample size of the studies, lack of fidelity monitoring and high heterogeneity in terms of how the MI intervention was delivered.

There have been a number of studies focusing on how the therapist can elicit change talk and the therapist skills preceding change talk. One study [92] examined the sequence between the therapist skills and the client's behaviour and found that MI consistent behaviours increased the probability of the client using change talk. MI inconsistent behaviours were more likely to be followed by counter change talk. MI consistent behaviours also significantly positively predicted change talk, however the findings also suggested that reflective statements, reframing and raising concern without permission were significantly positively related to change talk. Therefore it may be that there are other therapist behaviours that are associated with change talk [93]. MI consistent behaviours also significantly predicted the decision to complete a change plan [94].

There are a number of measures that code therapist and client behaviour within an MI session: MITI [28], MISC [185], SCOPE [186] and CLEAR [187]. However these were all developed before the new stage of planning was added to the MI process, therefore, these measures do not code planning. In order to examine whether planning is an "active ingredient" of MI within a WLM session, a coding system for planning

within MI needed to be developed. Exploratory thematic analysis of the MI sessions was considered useful to assess therapist skills prior to planning and to give insights into how to potentially encourage planning talk in clients. Current coding systems did not assess this as they were developed before the planning stage was identified in MI, thus looking in-depth at the therapist skills is not included within the existing measures. This Thesis focused on developing a coding system and applying it to MI data to test the association between planning within a MI session and outcomes. This was followed up with an exploratory thematic analysis of the therapist skills to assess which skills seemed to lead to planning talk.

The primary aim of this Thesis was to develop a coding system to measure planning within an MI session. The research questions were:

Main research question
What are the types of planning talk used by clients during an MI session and are they related to outcome?

Phase one

Can we define planning talk used by clients during MI sessions addressing weight loss maintenance?

Can we develop a reliable measure of planning?

Phase two

Can we reliably identify and measure forms of planning talk within weight loss maintenance consultations?

Is planning talk related to weight loss maintenance outcomes?

Does planning lead to a decrease in weight, BMI and an increased likelihood of maintaining a weight loss compare to goal setting?

Is more specific planning associated with better outcomes?

Does planning talk vary in commitment strength and is this associated with outcome?

What therapist skills are used prior to planning that may elicit plans from the client?

8.2 Main findings and interpretations

8.2.1 Development of the coding system

I set out to define plans and goals, develop the planning talk coding system and test its reliability within data consisting of recorded MI sessions with clients trying to either

lose or maintain their weight. To date there is no measure of planning that has been developed to code plans within MI sessions.

A focused discussion group was involved in the development of the coding system. The group included two psychologists with expertise in obesity, behaviour change (SS, RM) and qualitative methods (SS), an expert in the field of MI (SR) and a statistician (MK). This group thematically analysed some of the MI sessions and provided feedback on the coding system as it developed. The development of the planning talk coding system involved searching the literature to identify what planning is defined as and the different types of plans already identified. Eleven MI sessions were also thematically analysed to identify different types of plans and to help develop definitions of goals and plans. I reviewed nine of these MI sessions and the focused discussion group reviewed two. Results from both approaches were combined using the OSOP technique which is a thematic map that visually presents the themes and their relationships. The group discussed the types of plans that had been presented and selected those that best represented the plans occurring in the MI sessions. This was based on my knowledge of nine analysed MI sessions and the groups knowledge of two. From this the planning talk coding system was developed.

The coding system was tested to assess how well it could be used to code the data. I tested the coding system within a total of 20 MI sessions and from these sessions the group tested five sessions. Any problems found were brought to the focused discussion group for further consideration. Modifications were then made to the coding system to overcome these problems and this was tested in the MI session data again. Each time this occurred I tested the coding system with five MI sessions and the group tested it with one of these five sessions. This process was repeated four times until the coding system could be applied to the data by the focused discussion group without any issues arising. The final coding system was produced (Appendix C4-3).

The definition of a goal was agreed to be a desired state that a person wants to achieve, where states are outcomes, events, or processes [207]. The definition of a plan agreed upon was that a plan is an action for the future, it is volitional, involves thought before action and contains behaviours. There were different plans identified in the coding system: past, continuing, future and hypothetical plans. Plans and goals were also examined in more depth in relation to specificity and commitment. They were rated on

commitment because it has been found that commitment was related to outcome and the strength of that commitment could be measured based on the client's language [208]. Specificity was also included as it has been found that Implementation Intentions can improve outcomes [128 130].

The final coding system was tested for reliability. Prior to the main testing of the reliability of the coding system, the training presentation and coding data, were piloted with a group of nine Thesis students from the Department of Primary Care and Public Health at Cardiff University. They provided feedback which enhanced the training and materials. The coding system was then tested with 10 researchers independent of the supervision team. They were given 15 examples from MI sessions of plans and goals and a 3 page subsection of a transcript to code. The results from the reliability test demonstrated a good level of reliability. The results were compared to the gold standard to calculate the percentage agreement. The gold standard was set within the focused discussion group after they independently coded the examples and then resolved any disagreements. The examples indicate 86% agreement, and the transcript 75% agreement with the gold standard.

These results are similar to the reliability levels that have been found for the SCOPE and the MITI. The SCOPE results indicated that 75% of the global ratings yielded in the good to excellent range (interclass correlation score of ≥0.75), while only 44% of the behaviour counts yielded this level of accuracy [239]. Inter rater reliability for the MITI showed good-to-excellent results (interclass correlation score of ≥0.75), for each item [240]. In the current study the difference between the rater's scores could perhaps be due to the way different raters parsed the transcript. The transcript needed to be broken down (parsed into sections that could be coded with one code). If people do not parse the data in the same way this can lead to an increase in codes and therefore a discrepancy between coders. The unreliability of parsing has also been noted in a study where the coders used the SCOPE [92]. This is an issue that needs to be addressed by MI coding measures. Training must focus on this issue as it is key to coder agreement.

The parsing of the transcript data is an area that could be improved for future training and reliability of the planning talk coding system. The results, however, show that researchers can be trained to use the coding system within a 2 hour period and good reliability across coders can be achieved. This is an important issue as it is helpful in

research if people can be trained to a competent level in a measure relatively quickly. In comparison with other coding systems, this level of training is much less than what is currently required, for example to train MITI raters which is usually a minimum of two days with on-going support. It is likely that some level of on-going support is also required for this planning talk measure.

8.2.2 Application of the coding system

The coding system was applied to 50 MI sessions. These initial results indicated that the planning talk coding system did not have any redundant codes. Descriptive statistics of the summary scores showed that all the codes were used during the coding process. There was also a wide range in the numbers of plans made per session from 1 to 39 which demonstrated that the coding system is sensitive to the range of plans made.

It was found that on average more plans were made per MI session than goals. This could be because people need to make multiple plans to achieve one goal they have set. This has been demonstrated with the action and coping planning literature [126 241]. For example, you need both action and coping plans to achieve a person's goal of increasing physical activity. One study found that the combination of high levels of action planning and coping planning was associated with increases in physical activity [126].

The goals and plans data were also examined in more depth in relation to specificity. The goal setting data indicated that participants were committed to the goals they set but were less likely to specify timelines for when they will achieve them. This was the opposite for plans. Participants were more likely to specify a timeline in which to achieve their plans. Participants may be more willing to specify a time for a plan as plans may be smaller and more attainable than goals. People can control whether they will go for a run tomorrow, but losing 3 stone by Christmas is harder and less controllable. These plans can be seen as proximal, compared to the distal goals that the participant is making. It has been suggested that motivation is increased for proximal goals compared to distal goals [218]. This is because it is easier to monitor the progress of proximal goals, and if progress is seen as going well it can increase self-efficacy and motivation [242]. One study found that proximal goals can provide performance feedback and increase self-efficacy which led to focused attention on tasks that allow people to achieve their goal [243]. Therefore plans are often proximal and could be seen

to have the same advantages as proximal goals. The participant is more motivated to achieve the plan and therefore can set a timeline to achieve it in compared to the goal which will take longer to achieve and is associated with less motivation.

The results were examined in further detail to investigate how often the different types of plans were made. On average continuing plans were used more often than hypothetical plans. Continuing plans were mentioned the most on average which would fit with the type of participant recruited into the study since all of the participants had already lost 5% of their body weight, meaning that they had already implemented plans to lose or maintain weight. The majority of the continuing plans were also coded as high specificity. There were slightly less future plans than continuing plans being made. The majority of future plans appear to have high commitment and high specificity.

8.2.3 Plans associated with weight outcomes

The relationships between plans and goals coded within MI sessions and the weight outcome data were examined. The different plans and goals were analysed as continuous variables and categorical variables, trichotomised into low, medium and high. The variables were trichotomised because there was uncertainty that planning data had a linear relationship with the WLM outcome data. Logistic and linear regression were used to investigate the association between the variables and the weight outcomes. The results from the continuous data suggest that the total number of plans that a participant makes could be associated with a decrease in weight and BMI. It was also found that high planners potentially decrease their weight and BMI compared to low planners. This supports the previous research on counselling combined with planning to change behaviour [31 122 123]. One study reported that planning prompted by MI skills led to action plans which were statistically significantly predictive of exercise [31]. Studies have also looked at incorporating implementation intentions into counselling interventions and found that this led to improved diet [123], exercise, foot care, depressive symptoms and diabetes medical symptoms [122]. Other research has demonstrated that implementation intentions can reduce weight [244 245].

The findings of this study are also supported in other planning literature which has demonstrated that developing plans can facilitate behaviour change. A review of the research evidence on planning [127] suggested that there is evidence that interventions that address coping planning alone, or action planning and coping planning together

show sustainable effects, up to 6 months, on health behaviours in clinical populations. RCTs have also found that action and coping plans can improve walking [125] and fruit and vegetable intake [33]. Therefore the results from this study are in line with the literature that planning combined with counselling can facilitate behaviour change and improve outcome.

The results from both the continuous and the categorical goal setting variables suggest that setting goals is associated with increases in weight. This was an unexpected result as it goes against research evidence which suggests that goal setting can help people change their behaviour [223 224]. However the evidence around planning does suggest that there is a long road between goal intentions and actually achieving them, as people need to deal with obstacles and repeated disruptions [6]. Theories such as the TPB, HAPA and Rubicon Model of Action Phases have suggested that planning could bridge that gap. The HAPA suggests that once an intention is formed the behaviour must be planned, initiated, maintained, and relapses managed. The intention must be transformed into detailed action plans of when, where, and how to perform the behaviour [108]. Planning mediates the intention-behaviour relationship, meaning that individuals with high intentions are more likely to engage in action planning, and those who plan are consequently more likely to achieve their desired behaviour (or goal) [107]. Therefore it is important for people to make detailed plans in order to achieve their goals. The participants needed to make detailed plans in order for their goals to be successful and thereby to demonstrate an association with a decrease in weight.

There is also an indication that goal setters potentially decrease their likelihood of maintaining a weight loss compared to low planners and no goal setters. This is an unexpected finding but may not hold up in other/larger samples and it would be helpful for future studies to look at the interaction. It may also be that goals are probably necessary but not sufficient to lead to behavior change, i.e. plans are what you need to achieve your goal. This thesis was unable to examine this hypothesis as the current data could not fit an interaction term as the data does not allow for the plans to be linked to specific goals. These are potential areas for future research.

8.2.4 Inter-rater reliability

Inter-coder reliability was used to assess the reliability of my coding of the data. Once all 50 MI sessions had been coded, three independent coders were assigned a random

sample of sessions. Fifteen percent of all sessions were double coded. They independently coded this data and a percentage agreement statistic was calculated. Coder 1 had coded all 50 MI sessions. Coders 2 to 4 were given a random selection of sessions to double code. These sessions were then compared with coder 1. The results of the inter-rater reliability were on average 61.2% agreement with coder 1 after coders 3 and 4 were retrained. This is in line with other studies that have used the MISC or the MITI. These studies [53 220-222] have found an inter-rater reliability score of between 0.59 and 0.95 depending on whether they are global scores or behaviour counts.

8.2.5 Therapist skills and planning talk

As the results indicated that the total number of plans were potentially associated with a decrease in weight and BMI it was thought useful to investigate what skills the therapists were using to elicit these plans. If this could be identified, then therapists could use this knowledge to guide and improve their practice to potentially make it more effective with regards to behaviour change. Thematic analysis was used to analyse the data [199]. It facilitated exploration and analysis of the MI sessions in more detail with a wider range of therapist skills than those coded with existing tools. Inductive and deductive thematic analysis was used to identify different themes in order to develop the coding framework.

The themes that emerged from the analysis were different from the MITI, MISC and SCOPE although there were some similarities. Within the existing MI coding systems simple and complex reflections and open questions are measured which did emerge as themes within the data. However, many of the other themes such as exploration of feelings, self-awareness, motivation, expanding on client's ideas and direct planning questions are not coded under the existing MI coding systems. Four main themes emerged from the analysis of therapist's skills prior to planning and when no planning occurred: (1) Affirm; (2) Exploration; (3) Questions; and (4) Reflections. However within these themes different subthemes emerged for planning and non-planning. The themes that occurred only prior to planning were direct planning questions and expanding the client's ideas. The other themes either occurred both before planning talk and non-planning talk or just prior to non-planning talk. These results suggest that it could be important for therapists to ask direct planning questions and encourage their clients to expand on their ideas if they want their clients to make plans. Asking the client to expand on their ideas not only led to clients talking about planning but possibly

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led to more specific plans. It is however, important for the therapist to listen for signs that the client is ready to make a plan. If the client is not ready to make a plan then this technique will not be successful [19].

Since many of the themes that emerged from the data are skills that MIPs are routinely advised to use in their MI sessions they are likely to occur prior to both plans and also non-plans. However, the results do suggest that there are differences between the occurrences of these themes which differentiate the skills used before client's' planning talk and non-planning talk. There are likely also to be other processes occurring within the MI session that increase the likelihood that clients will make plans. It may be more about the nature or content of the conversation rather than (or in addition to) the therapist skills. Therefore, future research is needed to analyse MI session data using conversational analysis or discourse analysis to get a deeper understanding of the processes occurring within the sessions.

8.3 Strengths and limitations

This study has a number of strengths. The first relates to an issue which is quite widespread in the MI literature [246], that of whether MI is actually being delivered, i.e. the quality of the MI delivered in the sessions. The findings from the systematic review within this thesis indicate that only 35% of studies stated they measured MI fidelity. Seven out of thirteen studies did not report their fidelity findings, one reported proficiency and five reported findings suggesting non-proficiency. This could have had a large impact on findings of these studies as statistically non-significant results could be reported due to MI being delivered poorly. In this study, the fidelity of the MI intervention was measured using the MITI. Overall the mean scores for each therapist indicated that all therapists reached proficiency for the global and the behavioural count measures within the MITI [28]. All therapists also reached competency on the global ratings and percentage of complex reflections from the behavioural counts [18 247]. This indicates that MI was delivered at least at a proficient level, therefore the clients received the intervention as it had been intended. The planning talk coding system was developed based on sessions that had been assessed by the MITI which demonstrated that MI was being delivered. This is an important strength of this coding system as it ensures that it can code MI.

Another strength is the interactive nature of the development of the coding system and independent reliability testing of the final coding system. One strength of the development process was that the coding system was developed based on thematic analysis of real consultations from MI sessions on WLM. Bryman et al (2006) [190] stated that the "methodological goal of an instrument's development is when qualitative research is used to develop questionnaires and scale items so these can be more comprehensively based on the data". Inductive thematic analysis [201] and the deductive approach [201 202] was used to develop the coding system. Combining both these approaches allowed for the coding system to be as comprehensive as possible incorporating insight from both the MI data as well as theory and other MI research. The external validity of the coding system was strengthened as it was based on the analysis of real MI sessions and not simulated consultations.

It was also developed via a rigorous process of testing the coding system within the data repeatedly. The coding system was developed on a large number of consultations (20). This process was similar to processes used to develop the behaviour change counselling index (BECCI) [211] and the Evaluation of AGenda mapping skiL Instrument (EAGL-I) [212]. The BECCI was tested in 25 MI based consultations by two independent coders and the EAGEL-I was tested with 35 MI based consultations. These were both GP consultations which meant the sessions were shorter than the MI sessions that were used to develop the planning talk coding system. This is a strength as the development process was very similar to MI coding systems that have already been developed and are being used in research. An attempt was made to examine the development process of the MITI, MISC and SCOPE, however this work has not been published.

The reliability of the coding system was tested in the "real world" via a group of researchers independent of the development group who provided feedback to improve the coding system. Finally good reliability of the coding system was demonstrated after training a group of 10 researchers who applied the coding system to the MI session data. Reliability levels were better compared to published studies such as the MITI which found reliability levels of 75% for the global ratings yielding interclass correlation in the good to excellent range, while only 44% of the behaviour counts yielded this level of accuracy [239].

A further strength of this thesis is that I was blinded to the weight loss/ weight maintenance results. Therefore my coding of the MI data using the planning talk coding system was not influenced by my knowledge of the participant's weight results. Fifteen percent of the MI sessions were also double coded by a second researchers (3 additional coders in total). It was found that there was an average percentage agreement of 61.2%, after coders 3 and 4 were retrained.

Throughout the development and implementation of the coding system there were independent checks put in place to ensure reliability and minimal bias. As mentioned earlier these results are similar to other studies that have used the MISC or the MITI. These studies [53 220-222] have found an inter-rater reliability score of between 0.59 and 0.95 depending on whether they are global scores or behaviour counts.

This is the first study to measure planning within a MI session. It is also one of the few studies to explore planning in relation to outcome. It is an important area to measure and therefore this is a further strength of this study. Finally the systematic review is the first to look at mechanisms of change within MI in relation to health behaviour. The review has also been published, strengthening the findings.

There are however also a number of limitations to this study. Firstly the coding system was developed and tested for reliability on WLM data so it may not be generalisable to other data sets. However, the codes within the coding were developed to be general and not specific to weight loss data. It would be useful to apply the coding system to other data sets to explore applicability to other health outcomes. However, until further work on the coding system such as testing internal consistency, stability and responsiveness to ensure the reliability of the measure has been conducted, results from other data sets should be interpreted with caution.

The generalisability of the results examining planning and WLM outcomes is also uncertain. The majority of the participants within this study were white female (86%), married (60%) and employed (88%) in a modern professional or clerical job (54%). Therefore this is not representative of the UK obese population with an under-representation of men, other ethnic groups, other marital status and the unemployed. However the participants are representative of the WILMA trial participants and of participants in weight loss/WLM research in general [13 248].

There was a limited sample size for this study due to the number of available recordings, which may have introduced bias. Issues identified in the WILMA study for non-recording of consultations included; participant non-consent, practitioner forgetfulness and technical issues. Due to the relatively small sample size, the study was underpowered, which limited the statistical interpretations that could be drawn from the data. According to the systematic review [12] the sample size from this study is similar to five studies examining MI and weight loss/WLM however 13 studies had a higher sample size. The results would need to be tested within a larger data set to assess whether the current findings would still hold.

The results should also be interpreted with caution as further development of the planning talk coding system is needed. This includes investigating the internal consistency, stability and responsiveness to ensure the reliability of the measure. The coding system should also be tested with a different MI data set as the MIPs were encouraged to use the "hot topics" in the sessions. These "hot topics" were aspects that according to research evidence may be important to weight loss maintenance. The hot topics were to be used flexibly within the MI sessions. They included goal setting, implementation intentions, habits, emotional eating, self-esteem, self-monitoring and coping with relapse. The MI sessions therefore included planning and goal setting. There were also forms that the MIPs filled out at the end of each session which recorded which hot topics were used, and to what extent. The MIPs were actively encouraged to use planning and goal setting which may have inflated the number of plans and goals in the MI session. However it may not be that there were inflated numbers of plans and goals as this training happened before the inclusion of planning in MI. Therefore this training could have included the new MI process. In the planning process according to Miller and Rollnick [227] the therapist should use a key question which asks the client, "So what's next?" The key question does not ask for the client to commit to any plan as this may evoke defensiveness. They should also encourage the client to expand of their plans and make them more specific. Therefore the training may not have inflated the number plans or goals but brought the MI practice in line with the new MI process. However the coding system should still be tested in another data set in which the clients are more ambivalent towards change compared to the WILMA clients such as a substance abuse data set.

The Hawthorne effect is the unwanted effect on an experiment, which arises from a tendency for people to modify their behaviour because they know they are being studied. This can therefore distort results and often occurs during social experiments [249]. In this study all participants who had given consent were aware that they were being audio recorded for the purposes of analysis by the WILMA trial and also this study. As a result, the participants may have been less resistant to the MI, in order to help the study and to be seen in a favourable light by the therapist as well as the WILMA study team. They may also have been less resistance to the therapist suggestions of setting a plan or a goal, therefore, inflating the number of plans that were made during the MI sessions. This could have affected the associations found between plans, goals and the weight outcomes. However, participants initially gave consent to have their audio recorded data used so that the therapist behaviour could be assessed. After all the face-to-face sessions had been recorded they were then asked to re-consent for their recordings to be used to look at their planning talk. Therefore, at the time of the audio recording the participants did not know that their language would be analysed for research purposes. This could have minimised any Hawthorne effect.

8.4 Reflexivity

Reflexivity is an awareness of the researcher's role, and the way it is influenced by the aim of the research. This awareness leads to the researcher acknowledging the influence this may have on the research process and outcomes. The researcher's perceptions, opinions and experience can also influence the research [250]. The advantage of this is that these opinions and viewpoints can help when interpreting data. However, individual perceptions can also lead to a biased interpretation of results if a variety of viewpoints are not considered. The researcher's reflexivity can allow them to take steps to limit bias and acknowledge any areas where they still might have influenced the research unintentionally. It is therefore important to think about how the positions and interpretations in the design and analysis of the planning talk coding system were influenced by myself and my colleagues.

My supervision team consisted of Dr Sharon Simpson, Dr Rachel McNamara, Dr Mark Kelson and Professor Stephen Rollnick. This supervision team formed the focused discussion group that helped to develop the planning talk coding system. Dr Mark Kelson provided advice on the statistical analysis examining the associations between planning and the weight loss maintenance outcomes. Dr Sharon Simpson and Dr Rachel

McNamara are psychologists with a background in behaviour change and developed the intervention used in the WILMA study. Dr Mark Kelson was the trial statistician for the WILMA study. Professor Stephen Rollnick co-developed MI and has co-written key texts on MI [227 251 252].

To what extent did the supervision team influence the decision to look at planning? I did become aware of the different types of mechanisms that are part of MI through my supervision team. We considered a number of options such as examining the therapist skills and outcome and the MI causal chain. My supervision team also made me aware of the importance of planning within behaviour change based on their knowledge of behaviour change research. Professor Stephen Rollnick also gave me insight into the new phase of planning that had just been included in the stages of MI in the latest edition of Motivational Interviewing: Helping People Change [227]. The WILMA study included planning as one of the theorised mediators. Therefore this influenced the decision to look at planning. The decision to investigate planning was also based on gaps within the MI literature on mechanisms. I was influenced by a consultation with Dr Theresa Moyers who has conducted research into change talk and addictions. She emphasised the importance of looking at a novel area of MI in terms of mechanisms and encouraged me to think about what has not been looked at previously. I considered both planning and relational depth as possible areas to focus on. I explored the literature further which reinforced that planning was important in behaviour change but was also an under researched area of MI. The HAPA, TPB and the Rubicon Model of Action Phases all stated that planning is an important aspect of behaviour change and can bridge the gap between intention and action. I also investigated relational depth further in the literature however it appeared that it was a new concept and was still very much in the development phase. I explored the themes that were emerging from the MI session data. This data was considered a potentially rich source of data about planning since WILMA clients will already have made plans to lose weight and will have successfully implemented these plans. Many of the clients will be looking for help to make a realistic plan that will help them maintain their weight loss. They are therefore potentially more likely to talk about the planning process of MI as they have voluntarily sought help to make their plans. They are therefore likely to be less ambivalent about change than those coming to MI with, for example substance abuse problems. After considering the WILMA MI session data, the MI literature, the advice from Dr Theresa Moyers and my supervision team who guided me by eliciting ideas and assisting me to

think about ways in which these ideas could be examined, I felt that planning would be an interesting and potentially fruitful avenue of exploration.

To what extent did the supervision team influence the development of the coding system? The supervision team also comprised the focused discussion group involved in the development of the coding system. Therefore, they may have influenced the content of the final coding system. Professor Stephen Rollnick had worked in conjunction with Professor William Miller to develop and incorporate the planning phase into MI [227]. Setting plans and goals had also been part of the WILMA intervention, therefore, there may have been influences from Dr Sharon Simpson, Dr Rachel McNamara and Dr Mark Kelson. However the development of the coding system was based on my reading and interpretation of the planning literature. It was also based on thematically coding the MI sessions and therefore was grounded in these as well as in my interpretation of these sessions. The focused discussion group guided this process and allowed me to share and discuss my ideas. However, my background as a trained counselling psychologist could have influenced the coding system. I practiced client centred therapy for a year, therefore had an understanding of the therapists' skills. However, client language in particular change talk and planning, were a new concepts to me, which I felt limited my influence on the interpretation of the data. The rigorous process followed in developing the coding system was based on my reading of the development of the BECCI [230]. It was also based on my reading about thematic analysis examining both the inductive and deductive approaches.

On reflection the thesis could have been improved by examing the interpersonal relationship between the therapist and the clients and its effect on planning. This could have led to a deeper understanding of the MI sessions. Discourse analysis could have been used to look at this and would have added a further level of understanding to MI. This has been acknowledged in this Thesis. Due to time constraints of the PhD a full in depth analysis of the interpersonal relationship was not possible. The Thesis could have also been improved by an increase in the number of MI session recordings and therefore participants. This could have been achieved with a stronger focus on strategies to boost recording rates, including a face to face meeting to address this issue and any barriers specifically.

I received guidance during my Thesis which has allowed me to develop my ideas. Working with a team of researchers has influenced my views as I have been exposed to multiple viewpoints from different research backgrounds. I feel this has enriched my understanding but I have also developed my own views based on researching the literature and my analysis of the data. It must be acknowledged my background as a trained counselling psychologist has influenced my views and may have influenced my interpretation of the MI session data. However my training as a counsellor has also enabled me to be aware of the nuances within MI and has helped with my interpretation of the data. This has helped with the development and implementation of the coding system as well as the analysis of the therapist skills prior to planning.

Overall there has been some influence on the aims of this thesis from the supervision team based on their involvement in the WILMA study and the development of the planning aspect of MI. This may have also influenced the interpretation of the MI sessions and how the coding system was developed. However it is acknowledged in the literature that bias and subjectivity are inevitable within research. It is important to acknowledge potential bias within research to ensure that it is a transparent process and it is important to be aware of ones biases [253 254].The influence of some of these potential biases within the development and application of the coding system and the thematic analysis of the skills have been minimised. This is due to double coding of the data, checking the reliability of the coding system and independently testing the coding system during its development. These biases may still have an influence on the interpretation of the data but it is hoped that these strategies have minimised this.

During the process of this Thesis I have learned about different research processes both qualitative and quantitative. I have learned how to conduct research in an effective manner. I have also learned about time management and management of people in order to complete this thesis within the allotted time of 3 years.

8.5 Comparison with previous studies

8.5.1 Development of measures

There are three previous studies [211 212 246] that have developed coding systems to measure therapist behaviour. All of these measures are used as training tools to help evaluate and develop therapist skills as well as in research. As far as we are aware the

development process for the MITI, MISC, SCOPE and CLEAR is unpublished. Therefore the development process of the planning talk coding system cannot be compared to these.

The first study developed a scale, the BECCI, for use by trainers and researchers when helping practitioners to learn the essential skills of behaviour change[211]. The authors conducted a literature review of the theory and practice of behaviour change counselling. Items were developed and sent to 12 experts in the field who provided feedback. The authors tested the selected items within consultations to ensure content validity. A construct explication exercise and a face validity check were also conducted. The BECCI was tested in 25 MI based consultations by two independent coders. Finally the reliability of the scale was tested on two data sets. The inter-rater reliability was $R=0.79$ and $R=0.93$ [211].

The second study [212] developed an agenda setting measure for clinical encounters. They developed the EAGL-I to measure agenda setting. Initially a structured literature review, and focus group study with clinicians in primary and secondary care were used to map components of agenda setting. The Delphi technique was use to gain expert opinion on the definition and domains of agenda setting. The measure was piloted within 35 MI based consultations with multiple versions of the EAGL-I until the final version was decided upon. The inter-rater reliability was calculated with two raters ($p^2= 0.797$) and three raters ($p^2= 0.855$). Finally it was used to assess third year medical student agenda mapping skills [212].

The Motivational Interviewing Supervision and Training Scale (MISTS) [246] was developed to help train people in MI and to be used for the supervision of MI. It measures the therapist's skills but in a way that can be used easily in training sessions. The MISTS measures the behavioural count of the types of therapist responses uttered during sessions and a 16 item global rating of the quality. The behavioural counts were based on the items that Miller and Rollnick described as key to the implementation of MI [246]. The 16 item global rating was developed via a group of three researchers and two practitioners. Initially a 27 item version was developed by the group which was based on group discussions, reviewing the MISC and the literature on MI. An initial version of the global rating was piloted with 30 MI sessions which provided feedback on the rating. This led to a revision to the 16 item scale [246]. This final version was

reviewed by five independent researchers for content. The reliability of the 16 items was then tested with 50 MI sessions and examined using generalisability theory. The results demonstrated a generalisability coefficient (p^2) of = 0.79.

There are a number of similarities between the method of development used for these measures and that used for the coding system described in this thesis. I initially started with a literature review which is how BECCI, EAGL-I and the MISTS began their development process. However unlike these measures I also thematically analysed nine MI sessions to develop the initial components of the planning talk coding system and grounded these in the data. All the measures also incorporated the views of an expert group to help identify components of the measures. This was also part of the development process of the planning talk coding system. All measures were piloted within a relevant dataset to help test and revise the items. These datasets ranged from 25 to 30 sessions which is similar to the planning talk coding system that used 20 sessions, as these were longer.

The reliability of measure/assessment tools should be assessed [255] and therefore the BECCI, the EAGL-I, the MISTS and the planning talk coding system were all tested for this. The inter-rater reliability of these measures ranged from 0.79 to 0.93. The development process of the MITI and the MISC has not been published but studies have demonstrated inter-rater reliability scores for these measures [53 220-222] of between 0.59 and 0.95 dependent on whether they are global scores or behaviour counts. Analysis of the reliability of the planning talk coding system found the percentage agreement for the examples of plans and goals was 86% agreement and for the coding of the transcript was 75% agreement for the reliability. The planning talk coding system reliability results therefore compare favourably with the results obtained for these other measures.

8.5.2 Planning and behaviour change

The HAPA model describes the process by which people can enact their intentions. The motivational process involves goal setting and the volitional phase includes planning, initiation, maintenance, relapse management, and disengagement [108]. This model provides a theory to map the results from this study and previous studies. There have been four previous [31 32 122 123] studies investigating planning in relation to behaviour change, with two of these studies using an MI intervention. The results from

this thesis suggested that people set goals during MI sessions. However goal setting is probably necessary but not sufficient, and the interaction between goals/plans in terms of outcome needs further investigation. They also set past, continuing, future and hypothetical plans. The goal setting fits into the motivational phase of the HAPA. The goal setting demonstrates that the person has formed an intention to perform a behaviour. The types of plans reflect the volitional phase. The past plans represent the disengagement stage, the continuing plans represent the maintenance stage and the future plans represent the planning stage. Therefore the participants have multiple plans which are at different stages of the volitional phase.

The results investigating the therapist skills prior to planning found that asking planning questions and asking the client to expand on their ideas were two themes that occurred often prior to planning talk. Asking planning questions is in line with the recommendations made by Miller and Rollnick [227] for therapist when eliciting planning talk from the client. They suggest using a key question which asks the client, So what's next? Miller and Rollnick [227] state that it is important to recognise that ambivalence may still be present during the planning stage. It is important to evoke the client's experience and listen to how behaviour change can work within the client's life. It is also important to have a clear goal in order to help with the planning process and lead to a clear plan. This means it is important for the therapist to help the client set a clear goal but also to develop a specific plan and identify the process or behaviours needed in order to achieve that goal. Finally, the therapist should help the client to think about the potential obstacles that might stop them from enacting the plan. Once the client identifies these the client can make further plans to cope with these obstacles. The results from the therapist skills analysis are in support of the recommendations made by Miller and Rollnick [227] and also support the HAPA model. This maps onto the HAPA as the initial goal setting during the therapy fits in with the volitional phase of the HAPA. The further planning and maintenance phases of the HAPA model are represented by the planning, encouraging specific plans and exploring obstacles to help with maintenance of the planning phase of the MI session.

Examining planning and behaviour change, two studies incorporated implementation intentions into counselling interventions. The first study [122] evaluated the effects of a brief telephone ''coaching'' intervention, which included helping patients translate broad goals into weekly implementation intentions, to improve diabetes outcomes. The

results showed the coaching intervention produced significant improvements on: diet, exercise, foot care, depressive symptoms and diabetes-related symptoms. Another study [123] testing implementation intentions within telephone counselling [123] examined the feasibility of eliciting dietary changes in participants. It led to participant's fruit and vegetable servings doubling (p=0.04). Both of these studies can be mapped onto the HAPA model as the clients have set goals and are encouraged to make specific plans to achieve them. HAPA states that the intention must be transformed into detailed action plans of when, where, and how to perform the behaviour [108]. Therefore counselling incorporating this process has been shown to improve outcomes.

The planning coding system reflected the types of plans participants make as well as the fact that the plans vary on how specific they are. Although within the MI sessions the participants did not set implementation intentions or action plans, the therapist did ask the clients to expand on their ideas in order to encourage the clients to make their plans more specific. We were unable to draw conclusions about the association between specificity of plans and outcomes, however, the results did support the association between plans and outcomes. These findings reflected the results of these recent studies of counselling sessions that incorporated implementation intentions and the HAPA model.

Studies examining action planning found a medium effect size for MI on action plans (d=0.42) [32]. One RCT [31] found the MI techniques condition led to more complete action plans and a longer duration of physical activity up to six months. With regards to coping planning, older and middle-aged adults benefited more from interviewer-assisted planning while younger adults benefited more from self-administered planning [31]. These studies used MI to encourage action and coping plans to be made and examined the association with outcomes. The action plans can be mapped onto the HAPA model in the same way as for implementation intentions, which are part of the volitional planning phase. The coping plans are part of the maintenance and relapse management phase.

The results from this Thesis support these previous studies, as we found a potential association between planning and weight loss and a decrease in BMI. This Thesis also adds further support for plans within MI as the plans occurred naturally within the session compared to previous studies which told the participants in advance that they

must make plans. Therefore unforced, naturally occurring plans also appear to be associated with outcome, and this is in line with the principles of MI.

This Thesis did not look at whether MI increased planning behaviour, like a recent study [32] examined whether MI could increase action planning. However the association between goal setting and weight loss was examined, which previous studies do not appear to have done. This study did not look at whether MI increased planning as there was no control group who also were encouraged to make plans in order to measure these plans. This would be an interesting area for future research, to understand whether MI can promote planning.

8.6 Further research

Further research needs to be conducted with a larger sample size and in different settings to examine whether the potential association between planning and weight loss outcomes still holds, and to examine any interaction between goal setting and planning, in relation to outcome. The planning talk coding system needs to be tested in other datasets particularly those that aren't related to weight or MI to see if it can be used as a generic measure of planning.

Further work on the development of the planning talk coding system needs to be conducted. This includes looking at the internal consistency of codes to ensure that there are no redundant codes. The reliability should also be tested again on an independent dataset to examine whether the reliability can be replicated in a dataset the coding system was not developed on. Stability should be examined to test the correlation between the same rater at different time points. Finally responsiveness of the planning talk coding system should be investigated to assess whether the measure is sensitive to change over time of planning talk.

It also remains unclear if it is how committed a client is to a plan, or how specific the plan is that is important. Commitment [184] to a plan and the specificity [128 130] of a plan have been identified in the literature as important aspects in relation to behaviour change. Future research should investigate the relative importance of the commitment to and specificity of a plan to gain a greater understanding of what are the key aspects of planning for behaviour change.

I did not control for change talk within the analysis. Therefore it is unknown to what extent planning explains variability in outcome compared with change talk as a whole. Change talk could potentially explain a large part of the variability in outcome. Therefore, future research would need to include change talk within the model to test this theory. This was not within the scope of the Thesis due to a recent meta-analysis [256] which looked at the causal chain within MI and found that client change talk was not associated with follow-up outcome ($r = 0.06$, $p = 0.41$). Therefore it is likely that planning talk does explain large part of the variability in outcome, however this still needs to be tested.

Statistical analysis of the therapist's behaviours prior to the planning talk occurring could also be examined. The odds of a plan occurring after a particular therapist behaviour could be measured. This would add to the understanding of what therapist behaviours trigger a client to make a plan. This could then enhance therapists understanding of the techniques they may need to use to elicit a plan from a client.

The results from the analysis of therapist skills suggest that there are differences between the occurrences of these themes which differentiate the skills used before planning and non-planning talk. These differences in therapist skills have been identified by this analysis which can be further investigated. All skills identified could be linked to planning using regression analysis. There are likely also to be other processes occurring within the MI session that increase the likelihood that clients will make plans. It may be more about the nature or content of the conversation rather than (or in addition to) therapist skills. It could be that it is due to the therapist sensing the client is ready to make a plan and using certain skills to elicit planning from the client. Therefore, future research is needed to analyse MI session data using conversational analysis or discourse analysis to get a deeper understanding of the processes occurring within the sessions.

8.7 Research and practice implications

To date, there is a lack of evidence for specific "active ingredients" that may account for the efficacy of MI in addictions and health behaviours [21 26]. It is important to understand how MI works as this could lead to improvements in practice and efficacy, focus research efforts and facilitate a better understanding of what helps people to change behaviours [27]. Planning is a new stage within MI and it is known from

behaviour change research that planning has an important role in behaviour change. Therefore it is important to be able to measure planning within the MI session. The planning talk coding system makes it possible to code this. This is useful to researchers as they can measure planning and examine associations with relevant outcomes. A group of researchers were trained to use the coding system within 2 hours, and our results demonstrate that the coding system can be used reliably by researchers. As the coding system can be used after only 2 hours of training, it can easily be used in a research environment without having to find time and resources for a two day training course. However there are still improvements to be made to the training and the planning talk manual particularly in relation to the parsing of the transcripts. This needs clarification to improve the reliability of coding. These improvements then need to be tested again to examine whether there has been an improvement to reliability. It could also help to identify some MI intervention work and why some do not. As stated by Rollnick "if major adjustments in the dose of treatment have so little apparent impact, perhaps an understanding of what drives change will not be found in the fine-tuning of treatment methodologies." It may be that what needs to be investigated is the mechanisms of MI that that could be driving change. Understanding the mechanism could lead to improved practice. This planning talk coding system could allow the research to examine further whether planning is a mechanism of MI as it provides a measure of planning within a MI session.

Understanding planning within MI could improve practice, as therapists could use the findings from this research to change the way they work. The results from this study suggest that it is important for clients to make plans in order to improve behaviour change and outcomes. Therefore it is important for therapists to recognise that planning is a key element of MI. Therapists could use these findings to focus on improving their practice and to evoke planning. It could also be incorporated into MI training to help improve therapist skills to evoke planning. The results from this study suggest that the recommendations by Miller and Rollnick [227] to ask planning questions and evoke specific plans are important areas to be included as part of the MI training process

8.8 Conclusions

Findings from this study suggest that the planning talk coding system is a reliable and valid tool for measuring planning talk within a WLM MI session. It has been developed through an inductive and deductive approach based on the research literature and audio

recorded MI sessions. While these findings are promising, they represent the first stages in the development of the coding system to measure planning. There are limitations to the research which represent the next steps for the coding system. It should be tested within different data sets to assess if it can measure planning within different contexts. Finally the reliability of the coding system needs to be further tested.

We have also demonstrated a potential association between planning and a decrease in weight and BMI. However, caution is advised with the interpretation of these results due to the small sample size leading to the study being underpowered. This work is exploratory in nature but indicates a potential relationship which needs further research in a larger data set to assess whether the association still holds. Also it is unclear if change talk explains more of the variability than planning talk does, however this might be unlikely based on the recent meta-analysis [256] that found no association with change talk and outcomes.

The planning talk coding system has practice implications for both therapist and researchers. Planning is a new stage within MI and therefore this coding system could help researchers to assess whether planning is important to behaviour change within MI. If it is found to be important then it could also influence therapist practice and training with more emphasis placed on planning.

In conclusion, while caution is advised with the interpretation of the association between planning and outcomes due to sample size as well as the stage of development of the coding system, these findings are encouraging as it is possible to measure planning within a MI session and that it is potentially associated with behaviour change and a mechanism of MI. There is also some evidence that the total number of plans is an important factor for successful weight maintenance.

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Appendix

Appendix C3-1 Full search terms

Full search terms

Search terms PSYCHINFO
1. exp Motivational Interviewing/
2. Motivation* enhance* therap*.tw.
3. Brief intervention.tw.
4. Directive counsel*.tw.
5. Brief motivation* intervention.tw.
6. exp Psychotherapeutic Processes/
7. exp Therapeutic Processes/
8. exp Readiness to Change/
9. exp Psycholinguistics/
10. exp Therapeutic Alliance/
11. exp Therapist Characteristics/
12. exp Language/
13. (mechanism* adj3 (change or action or behav* or causal*)).tw.
14. goal set*.tw.
15. intention-behav* gap.tw.
16. plan.tw.
17. planning.tw.
18. planned.tw.
19. plans.tw.
20. Empath*.tw.
21. change talk.tw.
22. Commitment strength.tw.
23. Change talk sequence.tw.
24. (Therapist* adj3 (behav* or variable* or technique*)).tw.
25. exp physical activity/
26. exp exercise/
27. exp health/
28. exp nutrition/
29. exp food intake/
30. exp lifestyle/
31. exp weight reduction/
32. exp weight control/
33. Self Regulation.tw.
34. Eating Behavior.tw.
35. fruit*.tw.
36. vegetable*.tw.
37. self care.tw.
38. pedometer*.tw.
39. weight loss.tw.
40. weight loss maintenance.tw.
41. exp obesity/
42. exp body mass/
43. exp body weight/
44. hypertension.tw.
45. hyperlipidaemia.tw.
46. heart disease*.tw.
47. medication adhereance.tw.

Search Terms MEDLINE
1. Motivation/px [Psychology]
2. Directive Counseling/
3. motivational interview*.tw.
4. Motivation* enhance* therap*.tw.
5. Brief intervention.tw.
6. Brief motivation* intervention.tw.
7. exp linguistics/
8. exp language/
9. Psychotherapeutic Process*.tw.
10. goal set*.tw.
11. intention behav* gap.tw.
12. plan.tw.
13. plans.tw.
14. planning.tw.
15. planned.tw.
16. implementation intention.tw.
17. (change adj2 (readiness or talk or language or process*)).tw.
18. Psycholinguistics.tw.
19. (mechanism* adj2 (change or action or behav* or causal)).tw.
20. Empath*.tw.
21. commitment strength.tw.
22. causal chain.tw.
23. Change talk sequence.tw.
24. (alliance adj3 (therap* or work*)).tw.
25. (Therapist* adj3 (behav* or variable* or character* or technique*)).tw.
26. exp physical activity/
27. exp exercise/
28. exp health/
29. exp diet/
30. exp food intake/
31. exp lifestyle/
32. Self Regulation.tw.
33. Eating Behavior.tw.
34. fruit*.tw.
35. vegetable*.tw.
36. self care.tw.
37. pedometer*.tw.
38. weight loss.tw.
39. weight loss maintenance.tw.
40. exp weight reduction/
41. exp obesity/
42. exp body weight/
43. body mass.tw.
44. hypertension.tw.
45. hyperlipidaemia.tw.
46. heart disease*.tw.
47. medication adhereance.tw.

Search terms EMBASE
1. Motivation/

2. Directive Counseling/
3. motivational interview*.tw.
4. Motivation* enhance* therap*.tw.
5. Brief intervention.tw.
6. Brief motivation* intervention.tw.
7. exp linguistics/
8. exp language/
9. Psychotherapeutic Process*.tw.
10. goal set*.tw.
11. intention behav* gap.tw.
12. plan.tw.
13. plans.tw.
14. planning.tw.
15. planned.tw.
16. implementation intention.tw.
17. (change adj2 (readiness or talk or language or process*)).tw.
18. Psycholinguistics.tw.
19. (mechanism* adj2 (change or action or behav* or causal)).tw.
20. Empath*.tw.
21. commitment strength.tw.
22. causal chain.tw.
23. Change talk sequence.tw.
24. (alliance adj3 (therap* or work*)).tw.
25. (Therapist* adj3 (behav* or variable* or character* or technique*)).tw.
26. exp physical activity/
27. exp exercise/
28. exp health/
29. exp diet/
30. exp food intake/
31. exp lifestyle/
32. Self Regulation.tw.
33. Eating Behavior.tw.
34. fruit*.tw.
35. vegetable*.tw.
36. self care.tw.
37. pedometer*.tw.
38. weight loss.tw.
39. weight loss maintenance.tw.
40. exp weight reduction/
41. exp obesity/
42. exp body weight/
43. body mass.tw.
44. hypertension.tw.
45. hyperlipidaemia.tw.
46. heart disease*.tw.
47. medication adhereance.tw.

Appendix C3-2: Data extraction form Quantitative

Study Intervention

Behaviour studied	
Inclusion criteria	
Exclusion criteria	
Experimental Intervention	
Control	
Outcomes assessed	
Treatment arms comparable at baseline? Presented baseline characteristics	Yes ☐ No ☐ Unclear ☐
Confounders Identify which measured	Yes ☐ No ☐ Unclear ☐

Study Characteristics

Sample size (Number)	Recruited ☐ Number followed up ☐
Number of excluded participants	

Setting		
Study Design	RCT	☐
	Comparative descriptive study design	☐
	Time-dimensional designs	☐
	Longitudinal designs	☐
	Cross-Sectional designs	☐
	Trend designs	☐
	Event-partitioning designs	☐
	Descriptive correlation designs	☐
	Predictive designs	☐
	Model-testing designs	☐
	Interrupted time-series designs	☐
	Classic experimental design	☐
	Experimental post-test only comparison group desig	☐
	Randomised designs	☐
	Factorial designs	☐
	Nested designs	☐
	Crossover or counterbalancing	☐
	Other: specify observational	☐
Length of follow up	One month follow up	
Method of randomisation if randomised		

Mechanisms

Mechanism	

investigated	
Related to outcome	Yes ☐ No ☐
Outcomes related to mechanism (either directed related or implied relation)	Statistically Significant Empathy related to changing exercise patterns Yes ☐ No ☐ P-value ☐ Correlation: Effect Size ☐ Precision: Standard error ☐ SD ☐ CI ☐
Power calculation	Yes ☐ No ☐
Analysis-description Intention to treat analysis	Spearman correlation Not stated

Characteristics of patients

Age	Mean/ median SD/ interquartile range
Ethnicity Number and Percentage	
Gender Number and Percentage	Female: Number percentage Male: Number percentage

Socioeconomic status/ Education Number and Percentage	
Ethical Issues	Ethical approval: Yes ☐ No ☐ Unclear ☐ Informed consent: Yes ☐ No ☐ Unclear ☐

Treatment Details

Intervention Arms	
Timing of treatment	
Type of MI	MI ☐ Brief MI ☐ Motivational Enhancement Therapy ☐ Brief intervention ☐ Group MI ☐ Telephone MI ☐ Internet base MI ☐ Other: specify ☐
Duration of treatment	12 weeks
Time to follow up	
Job title of therapist e.g doctor, nurse, counsellor.	Therapist ☐ Doctor ☐ Nurse ☐

	Other: Specify	
Training of Therapist		
Treatment fidelity	Yes No How was it assessed?: Rating of fidelity:	
Adherence to MI	Yes No How was it assessed?: Rating of adherence:	

Bias

Study design	Fails to identify validity problems: Attrition effect:	
Measurement	Self-reporting bias: Invalid measure:	
Sampling	Wrong sample: Non repetitive sampling:	
procedural	Selective outcome bias: Effect of incentives used	
Blinding	Participant ☐ Assessor ☐ Researcher ☐ Clinician/ counsellor ☐ Not possible ☐	
Type 1/2/3 error	Type 1 error ☐ Type 2 error; ☐ Type 3 error	☐

Conclusions

Generalisability To what extent are the study findings generalisable? How applicable are the study findings to the system in the UK?		
Are the conclusions justified?		
Conflict of interest		
Links to other references to be followed up		

Data extraction form Qualitative

Behaviour studied	
Inclusion criteria	
Exclusion criteria	
Intervention	
Study aims	
Key findings	
Who's perspective does the study report on?	
Ethical Issues	Ethical approval: Yes ☐ No ☐ Unclear ☐ Informed consent: Yes ☐ No ☐ Unclear ☐
Timing- what period was the data collected over?	
Sample selection	
Appropriateness of the sample selection. Is the sample right to answer the question?	Yes No
Sample size (number)	
Age	Mean/ median SD/ interquartile range
Ethnicity Number and Percentage	
Gender	Female- Male-

Socioeconomic status/ Education Number and Percentage		
Type of MI	MI	☐
	Brief MI	☐
	Motivational Enhancement Therapy	☐
	Brief intervention	☐
	Group MI	☐
	Telephone MI	☐
	Internet base MI	☐
	Other specify	☐
Duration of treatment		
Job title of therapist e.g doctor, nurse, counsellor		
Training of Therapist		
Time of interview/ when the data was collected e.g was a recording made of the therapy session?		
Analysis technique used	Thematic analysis	☐
	Thematic content analysis	☐
	Content analysis	☐

		Discourse analysis ☐	
		Conversational analysis ☐	
		IPA ☐	
		Other specify ☐	
	Mechanism investigated		
	Mechanism related to outcome	Yes ☐ No ☐	
	Outcomes related to the mechanism		
	Reflexivity Are the findings substantiated by the data and has consideration been given to any limitations of the methods or data that may have affected the results?		
	Conclusions		
	Generalisability To what extent are the study findings generalisable? How applicable are the study findings to the system in the UK?	Yes No Reason:	

What is the country of study?		233
Are the conclusions justified?	Yes No Reason:	
Links to other references to be followed up		

Appendix C3-3: Data extraction form RCT

Health Evidence Bulletins - Wales: Questions to assist with the critical appraisal of a randomised controlled trial (Type II evidence)
Adapted from the CASP questions (taken from Guyatt *et al.* Users' guides to the medical literature. II How to use an article about therapy or prevention. *Journal of the American Medical Association.* 1993; **270**: 2598-2601 and **271**: 59-63) and Barker, JM. Project for the enhancement of the Welsh Protocols for Investment in Health Gain. Project Methodology. Cardiff: Duthie Library. UWCM, 1996. Egger *et al.* How important are comprehensive literature searches and the assessment of trial quality in systematic reviews? *Health Technology Assessment* 2003; **7(1)**

Paper details   **Authors:**

               Title:
               Source:

A/ What is this trial about and can I trust it?
    Screening questions.

	Yes	Can't tell	No
1. Is the trial relevant to the needs of the Project?			
2. Did the trial address a clearly focused issue? in terms of: • the population studied, • the intervention given, • the outcomes considered.			
3. **Was there concealment of allocation?** Note whether: • the randomisation process was described explicitly eg the use of random number tables or coin flips; • there was some form of centralised randomisation scheme eg central allocation or use of sealed opaque envelopes.			
4. Were all the patients who entered the trial properly			

		Yes	Can't tell	No
accounted for at its conclusion? • was follow-up obtained for 80-100% of subjects? Note % follow-up. • were patients analysed in the groups to which they were randomised?				

Detailed questions

	Yes	Can't tell	No
5. Were patients, health workers and study personnel 'blind' to treatment? • patients? • health workers? • study personnel?			
6. Were the groups similar at the start of the trial? In terms of all the factors that might be relevant to the outcome: age, sex, social class, life style etc.			
7. Aside from the experimental intervention, were the groups treated equally?			

C/ Are the results relevant locally/to me?

	Yes	Can't tell	No
10. Can the results be applied to the local population? Do you think the patients			

covered by the trial are similar enough to your population? Consider culture, geography etc.			
11. Were all important outcomes considered? If not, does this effect the conclusion(s)?			

Appendix C3-4: Data extraction form interventional study without randomisation

Health Evidence Bulletins - Wales: Questions to assist with the critical appraisal of an interventional study without randomisation (Type III evidence)

Sources used: Critical Appraisal Skills Programme (CASP, Anglia and Oxford RHA) questions, NHS Centre for Reviews & Dissemination, Guidelines for those carrying out or commissioning reviews. CRD report No. 4, 1996. Polgar A, Thomas SA. Chapter 22. Critical evaluation of published research in Introduction to research in the health sciences. 3[rd] edition. Melbourne: Churchill Livingstone, 1995.

Paper details	**Authors:**
	Title:
	Source:

A/ What is this paper about?

	Yes	Can't tell	No
1. Is the study relevant to the needs of the Project?			
2. Does the paper address a clearly focused issue? Are the aims of the investigation clearly stated?			

B/ Do I trust it?

	Yes	Can't tell	No
3. Is the choice of study method appropriate? • Has an acceptable method been chosen (eg interventional without randomisation, before-and-after study)? • Are the inclusion/exclusion criteria given? • Is the choice of control group (if included) adequate?			

C/ What did they find?

	Yes	Can't tell	No

4. Are tables/graphs adequately labelled and understandable?			
5. Are you confident with the authors' choice and use of statistical methods, if employed?			
6. What are the results of this piece of research? Are the authors' conclusions adequately supported by the information cited?			

D/ Are the results relevant locally?

	Yes	Can't tell	No
7. Can the results be applied to the local situation? Consider differences between the local and study populations (eg cultural, geographical, ethical) which could affect the relevance of the study.			
8. Were all important outcomes/results considered?			

Appendix C3-5 Data extraction form Qualitative

10 questions to help you make sense of qualitative research

How to use this appraisal tool

Three broad issues need to be considered when appraising the report of a qualitative research:

- Are the results of the review valid?
- What are the results?
- Will the results help locally?

The 10 questions on the following pages are designed to help you think about these issues systematically.

The first two questions are screening questions and can be answered quickly. If the answer to both is "yes", it is worth proceeding with the remaining questions.
There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

Screening Questions

1. Was there a clear statement of the aims .Yes .Can't tell .No of the research?

HINT: Consider
• What was the goal of the research?
• Why it was thought important?
• Its relevance

2. Is a qualitative methodology appropriate? .Yes .Can't tell .No

HINT: Consider

• If the research seeks to interpret or illuminate the actions and/or subjective experiences of research participants
• Is qualitative research the right methodology for addressing the research goal?

Is it worth continuing?
 Detailed questions

3. Was the research design appropriate to .Yes .Can't tell. No address the aims of the research?

 HINT: Consider

• If the researcher has justified the research design (e.g. have they discussed how they decided which method to use)?

4. Was the recruitment strategy appropriate to the .Yes .Can't tell .No aims of the research?

HINT: Consider

• If the researcher has explained how the participants were selected

• If they explained why the participants they selected were the most appropriate to provide access to the type of knowledge sought by the study

• If there are any discussions around recruitment (e.g. why some people chose not to take part)

5. Was the data collected in a way that addressed .Yes .Can't tell .No the research issue?
HINT: Consider

• If the setting for data collection was justified

• If it is clear how data were collected (e.g. focus group, semi-structured interview etc.)

• If the researcher has justified the methods chosen

• If the researcher has made the methods explicit (e.g. for interview method, is there an indication of how interviews were conducted, or did they use a topic guide)?

• If methods were modified during the study. If so, has the researcher explained how and why?

• If the form of data is clear (e.g. tape recordings, video material, notes etc.)

• If the researcher has discussed saturation of data

6. Has the relationship between researcher and .Yes .Can't tell .No participants been adequately considered?

HINT: Consider

• If the researcher critically examined their own role, potential bias and influence during

(a) Formulation of the research questions
(b) Data collection, including sample recruitment and choice of location

• How the researcher responded to events during the study and whether they considered the implications of any changes in the research design

7. Have ethical issues been taken into consideration? .Yes .Can't tell .No

HINT: Consider

• If there are sufficient details of how the research was explained to participants for the reader to assess whether ethical standards were maintained

• If the researcher has discussed issues raised by the study (e.g. issues around informed consent or confidentiality or how they have handled the effects of the study on the participants during and after the study)

• If approval has been sought from the ethics committee

8. Was the data analysis sufficiently rigorous? .Yes .Can't tell .No

HINT: Consider

• If there is an in-depth description of the analysis process
• If thematic analysis is used. If so, is it clear how the categories/themes were derived from the data?

• Whether the researcher explains how the data presented were selected from the original sample to demonstrate the analysis process

• If sufficient data are presented to support the findings

• To what extent contradictory data are taken into account

• Whether the researcher critically examined their own role, potential bias and influence during analysis and selection of data for presentation

9. Is there a clear statement of findings? .Yes .Can't tell .No

HINT: Consider

• If the findings are explicit

• If there is adequate discussion of the evidence both for and against the researchers arguments

• If the researcher has discussed the credibility of their findings (e.g. triangulation, respondent validation, more than one analyst)

• If the findings are discussed in relation to the original research question

10. How valuable is the research?

HINT: Consider

• If the researcher discusses the contribution the study makes to existing knowledge or understanding e.g. do they consider the findings in relation to current practice or policy?, or relevant research-based literature?

• If they identify new areas where research is necessary

• If the researchers have discussed whether or how the findings can be transferred to other populations or considered other ways the research may be used

Appendix C3-6 Data extraction form case series

Study id/ ref_____

Quality assessment for Case series

1. Case series collected in more than one centre, i.e. multi-centre study
2. Is the hypothesis/aim/objective of the study clearly described?
3. Are the inclusion and exclusion criteria (case definition) clearly reported?
4. Is there a clear definition of the outcomes reported?
5. Were data collected prospectively?
6. Is there an explicit statement that patients were recruited consecutively?
7. Are the main findings of the study clearly described?
8. Are outcomes stratified? (e.g., by disease stage, abnormal test results, patient characteristics)

Yes=1
No =0

Score: __/ 8

Appendix C3-7 Systematic search results

Study	Number of participants	Type of study design	Type of MI	Intensity of MI training	Intensity of MI on Participants	Is it MI plus other interventions?	Therapist mechanism	Client behaviours	Link on diagram	Measurements for mechanisms used	fidelity checked
Austin (2012)	26	post-test only comparison group designs	Short MI	8 week training course on foundational facilitation skills given by the prison before becoming facilitators. 5 day training course in short MI	5 sessions	MI with CBT combine. Session2 and 4 included CBT content.	MI spirit, acceptance, empathy, reflection to question ratio, open questions, complex reflections, MI consistent, MI inconsistent	Change talk and sustain talk and self-exploration	link 4a	MI skills code 2.1	no
Bennett (2007).	56	RCT	MI face to face and telephone	8 hours of group training and 6 hours of individual training by an experienced MI trainer	1 30 min session and 2 20 min calls	MI and a pedometer but not required to use it.	no	self-efficacy	link 1, 2b and 3b	6 point self-efficacy scale for psychical activity (Nigg and Riebe 2002)	yes-trainer listened to recordings of sessions and advised on MI strategies to ensure they were being used

Bennett (2008).	86	RCT	Phone MI	16 hours MI raining from a certified trainer	30 min call one week after receiving baseline survey.5 more phone calls one month apart to last for 15 mins	MI and a pedometer but not required to use it.	no	self-efficacy	link 1, 2b and 3b	6 point self-efficacy scale for psychical activity (Nigg and Riebe 2002)	yes. Rainier listened to recordings of sessions and advised on MI strategies to ensure they were being used
Britt (2008)	9	Two quasi-experimental designs. MET vs. usual care but patients not randomised	MET	two days (12 hours) training in MET provided by two trainers experienced in training MI, one of whom was the author	Comprised four 30-40 minute sessions of MI plus personalised feedback conducted over six weeks (on weeks 1, 2, 4 and 6).	MET and feedback	affirmation, emphasise control, open questions, reflections, reframe, support, confront, direct, raise concern, warn	Self-monitoring and readiness to change.	link 1, link2a and b self-monitoring and readiness to change and therapist mechanism.	Self-monitoring stated as a goal, Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) and MI treatment integrity.	yes-MET the ratio of reflections to questions was 1.17 reflections to a question. During MET sessions there were more open questions, complex reflections, and MI-consistent

											responses than during PE

| Brug (2007). | 142 | RCT | MI | 2 day basic MI skills training | 1, 30 to 40 min MI session and 3-4, 15 min session following | Just MI | Empathy MI spirit MI adherence MI infidelity Close/ open questions Number of questions Simple/co mplex reflections Number of reflections | Number of change statements | link 1 and 2a and b | Motivational Interviewing Treatment Integrity (MITI) code and the Manual for the Motivational Interviewing Skill Code (MISC) | yes Reflecti on to Questio n Ratio =o.5

Percent Open Questio ns 21.1%

Percent Comple x Reflecti ons 15%

Percent MI- Adheren t 89%. All are non Proficie nt |
| Campbel l (2009). | 735 | RCT | phone MI | Min of 20 hours of training on MI principles and techniques, one hour weekly training meetings and practice interviews | Four 20 min MI calls over 9 months | Just MI | no | self-efficacy | link 1, 2b and 3b | *Self-efficacy* measured using one item for each behaviour, This item had a five-point Likert-type response, from very sure to very unsure | yes. Only reports empathy score of 6.1 and an average spirit score of 5.8,. Proficie ncy cannot be calculat ed |

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Channon (2007)	60	RCT	MI	No training provided. Was in training as a health psychologist.	Mean of 4 visits within 12 months lasting 20 to 60 mins. Number of visits dictated by participant	Just MI	no	self-efficacy	Link 1 and 2b	The Self-Efficacy for Diabetes Scale	no
Chin (2011)	16	Mixed methods. Classic experimental design and content analysis	MI	sixteen hour/two-day Motivational Interviewing training workshop conducted by a member of MINT	One Face to face MI session	MI and LEAP clinic helping to maintain an optimal weight through lifestyle changes, dietary adjustments, and physical activity	Listened to and not judged	readiness to change	Link 1 and 2b	Readiness Ruler Miller and Rollnick, 2002	no
Cox (2011)	461	Observational	observing untrained MI techniques	No training provided.	One visit to GP	just MI	MI spirit Empathy MI consistent behaviours Open questions Reflections	no	link 3a	Motivational Interviewing Treatment Integrity (MITI) scale	yes reported as low scores

Ernst (2007)	55	Mixed methods. post-test only comparison group designs and thematic analysis	MI	The nurses initially received 12 hours of training in communication skills that included MI. Following training and orientation which lasted 12 weeks.	Up to 6 sessions	MI and the nurse providing education, decision support, coaching for health behaviour change, social support, clarification of medical/diagnosis/treatment issues, and assistance navigating the health care system.	acceptance, empathy, MI spirit, support, affirm, closed and open questions, simple and complex reflections, MI consistent and MI inconsistent.	change talk and client self-exploration	Link 4a for empathy, MI spirit, acceptance, support statements, complex reflections MI consistent and MI inconsistent to self-exploration. Link 2b for change talk	*Motivational Interviewing Skill Code 2 (MISC-2.)*	yes-one session met all of the thresholds for beginning proficiency and 32%met three of the five thresholds.
Feld (2001).	19	pre and post test trial	MET	Not stated	Four one hour sessions over 4 weeks	Just MET	no	motivation to change	link 1 and 2b	The motivational scales are three Likert scales, from the hand out titled "To Change or Not to Change?" Adapted from Schmidt & Treasure, 1998	no
Gillham(2010).	52	RCT	motivational intervening style discussion	Not stated	One face to face session and then 2 follow up phone calls	MI and further information about stroke pathology and explanation of individual stroke risk	no	readiness to change	link 1 and 2b	The primary outcome was measured using a scale of readiness to change health behaviour after stroke validated and	no

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										adapted by Miller 11 from a health behaviour questionnaire designed by Rollnick	
Hardcastle (2012).	207	pre and post test trial	MI	2 day introduction course and 4 day advanced course and gained 6 months experience.	received between 1 and 6 sessions	Just MI	no	self-efficacy, stage of change and perceived behavioural control	link 1, 3b	Self- efficacy was assessed with the Self-Efficacy for Exercise Scale, a revision of McAuley's (1990)	yes-results not reported
Hardcastle (2011).	14	qualitative	MI	Not stated	5 face to face sessions	just MI	listening	motivation and self-monitoring	qualitative link 3a and b	Interviews	not stated
Jansink (2013)	940	RCT	MI	Four half day sessions (total 16 hours)	not stated	MI, the introduction of tools for structuring diabetes care, such as training in agenda setting, a local diabetes protocol based on the national guidelines that was discussed with them, and a social map for lifestyle support, instruction on record keeping to integrate	no	readiness to change	link 2b	style aspect the importance of and confidence in changing was rated on a five-point Likert scale;	no

						lifestyle counselling into general practice and introduction of tools to sustain improvements including an instruction chart					
Latimer-Cheung (2013)	12	pre, post test trial	Phone MI	I day motivational coaching course	I telephone session	Just MI	no	self-efficacy and action planning	link 4a	Participants completed a 6-item scale assessing perceived benefits of the visit such as increased confidence to strength train and number of action plans.	no
McDoni el (2010).	101	RCT	MI	not stated	2 MI sessions face to face	Both groups received MI and intervention received SMART (self-monitoring and resting metabolic rate technology) received a nutrition program based on resting metabolic rate. Computerised self-monitoring software.	no	self-monitoring, self-efficacy, perceived behavioural control and weight attitude	link 1 and 3b	questionnaire for assessing weight self-efficacy (WSE) and perceived behavioural control (PBC) and weight attitude (WAT)	not stated

Neame (2012)	16	Two quasi-experimental designs	MET	two days (12 hours) training in MET provided by two trainers experienced in training MI, one of whom was the author.	Comprised four 30-40 minute sessions of MI plus personalised feedback conducted over six weeks (on weeks 1, 2, 4 and 6).	MET and feedback	no	change talk	Link 3b and link 1	MISC 2.0	yes-tapes reviewed by trainer but no scores given
Newnham-Kanas (2011).	8	Quasi experimental design	MI principles to create a proactive alliance	certified professional co-active coach received training and certification through coaches training institute	1 hour long face to face session then 17 35 min phone calls over 17 weeks.	Just MI principles	no	self-efficacy	link1 and 2b	a self-efficacy questionnaire	not stated
Noordam (2013)	103	Observational	MI	Not stated	one clinic visit.	Just MI	Empathy, eliciting change talk, providing information and respect for the clients choice about behaviour change	readiness to change	link 4a	Behaviour Change Counselling Index (BECCI) and observed the patient's stage of change (SOC) for each consultation by identifying the patient's current lifestyle behaviour through the communication interaction between patient and PN	no

Olson (2008).	136	pre, post test control trial	Brief MI	3 hours of interactive training	one clinic visit.	MI and a comprehensive health and behaviour risk screener	yes- reflective listening, pros/cons and importance scaling	no	link 1 and 2a	clinician self-perceptions of motivational-interviewing skills	no
Perry (2011).	20	classic experimental design	MI	Trained in MI and incorporates brief MI interventions into the advanced nursing practice	30 min in person then 12 weeks of bi weekly 10 min booster MI sessions	MI and group walks	no	stage of change and strength of commitment	link1 and 3b	The exercise SOC short form (Marcus, Selby, Niaura, & Rossi, 1992 and MISC 2.1	yes- proficient in MI
Perry (2007).	46	RCT	MI	Not stated	30 min face to face MI session and 10 min weekly phone sessions for 12 weeks	MI and 1 hour weekly group walk with a 20 min discussion based on the principles of MI	no	self-efficacy	link 1 and 3b	Self-efficace questionnaire on Likert scale.	no
Pirlott (2012).	43	classic experimental design with selective sampling	MI	90 hours of MI training- workshops, videos, personal coaching and practice with standardised patients.	at least four 30- 60 mins one to one sessions	Just MI	Counsellor spirit, empathy, direction and MI-consistent behaviours, MI inconsistent	positive change talk and sustain talk.	link 4a	Motivational Interviewing Skill Code (MISC 2.1	yes- proficiency score not reported
Pollak (2010).	461	observational	Observing untrained MI skills	No training	one session with GP	Looking at MI skills	MI spirit, reflections, open questions, empathy, MI consistent and MI inconsistent	no	link 3a	Motivational Interview Treatment Integrity scale (MITI)	no

Pollak (2009).	30	observatio nal	Observing untrained MI skills	no training	one session with GP	Looking at MI skills	empathy, MI spirit, reflections and complex reflections MI adherent behaviours and MI non-adherent behaviours	no	link3a	Motivational Interview Treatment Integrity scale (MITI)	no
Pollak (2011).	320	observatio nal	Observing untrained MI skills	no training	one session with GP	Looking at MI skills	MI spirit, reflections, open questions, empathy, MI consistent and MI inconsiste nt	autonomy support	link 3a, 5b for reflections	Motivational Interview Treatment Integrity scale (MITI)	no
Pollak (2007).	25	observatio nal	Observing untrained MI skills	no training	one session with GP	Looking at MI skills	empathy, MI spirit, MI adherent behaviours and MI non-adherent behaviours	self-efficacy and readiness to lose weight	for therapist mechanism link 3a and for other mechanisms link 2b	Motivational Interview Treatment Integrity scale (MITI)	no
Resnico w (2001).	861	RCT	MI	three, two hour training sessions	3 MI calls	MI and Culturally sensitive multi-component self-help materials-23 min video, eat for life cookbook, printed education materials and a 5 day message	no	self-efficacy	link 1,2b and 3b	Self-efficacy to eat more fruits and vegetables was assessed with a 10-item scale (α= .90) based on the work of Sallis et al	no

					board						
Riegel (2006).	15	mixed methods pre-test post-test design.	MI	Assigned readings, discussions with experts and eight intense role playing sessions. Also trained in family counselling.	3 MI face to face sessions over 3 months	Just MI	Reflective listening and expressing empathy	no	link 1 quantitatively and link 3a qualitatively	interviews	no
Riekert,(2011).	37	pre-test post-test trial	MI strategies	2 day training from co-investigator who was a member of MINT	5 home visits 30 -40 minutes long	Just MI	no	readiness to change and self-efficacy	Link 1 and 2b	The adolescent chose one of five statements from the Asthma Readiness to Change Questionnaire and The Child Asthma Self-Efficacy Scale	no
Seid (2012).	26	RCT	Brief MI	workshop on MI and group and individual practice, with 20 hours of training for each of the therapist over 2 weeks	2 face to face 25 minute sessions	MI and problem solving skills training and test messages	no	motivation	link1 and 2b	Motivation was assessed via two items. Adolescents were asked, ''On a scale of 1–10, where 1 is not motivated at all and 10 is very motivated, how	yes-scale of 1–5, where 5 is most adherent to MI principles, averaged 3.89 (SD = 0. 63)

										motivated are you to take your [name of daily medicine] every day?'' and, ''On a scale of 1 to 10, where 1 is not motivated at all and 10 is very motivated, how motivated are you to avoid things that make your asthma worse?'	
Shaikh (2011).	1021	RCT	telephone MI	Not stated	4, 30 minute MI phone sessions	MI and culturally targeted intervention materials	no	motivation and self-efficacy	link1, self-efficacy link 2b and 3b, motivation link 3b	revised 15-item version of the Treatment Self-Regulation Questionnaire (TSRQ) and This variable was assessed with a previously developed 10-item behaviour-specific scale (Baranowsk, Hearn, Baranowski, Smith, & Doyle, 1995	no

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Smith (1997).	22	RCT	MI	not stated	3 face to face sessions	MI and 16 sessions for group behavioural weight control program.	no	self-monitoring	link 1 and 2b	Number of competed food diaries	no
Treasure (1999)	125	RCT with an active control of CBT	MET	training was provided by a qualified expert	4 weeks	MET followed by either group or individual CBT	no	therapeutic alliance and stage of change	link 1. Stage of change is link 2b and therapeutic alliance is link 3b	Stages of change were measured using the 24-item University of Rhode Island Change Assessment Scale (URICA) and Therapeutic alliance was assessed using the Working Alliance Inventory (WAI: Horvath and Greenberg, 1989)	no
West (2007).	217	RCT	MI	Structured training in MI	5 face to face sessions lasting 45 minutes	MI and group based weight control program	no	self-monitoring	link1 and 2b	Number of compete diaries	yes-tapes reviewed by trainer but no scores given
Ziegelmann (2006).	373	RCT	interviewer assessed using core skills on MI used: empathic listening, eliciting self-	Not stated	one session with interviewer	Just 3 MI skills to assist planning	no	planning-action, coping and Compensation	link 2b and 3b	Number of complete plans	no

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			motivation and responding to resistance								

Appendix C4-1: MIMIC- MI session recording transcription procedure.

●   Audio files for transcription can be found at S:\SEWTU

Studies\WILMA\Intervention & Control\Intervention\MIPs\MI sessions recordings in

the transcription audio files folder.

- Create the transcript in Microsoft Word using font type Times New Roman, size 12.

- Transcribe the speech verbatim (i.e., as you hear it) not as 'corrected' speech. There is no need to make the speech grammatically correct as we would like to see exactly how the words are phrased by the interviewee's themselves.

- Omit all personal details (names, addresses, places of work, date of birth etc.) or references that would make people easily identifiable details (e.g. institutions). Use an anonymised description of the item in double brackets, e.g. ((name of hospital)) or ((name of town)).

- On each transcript, at the top of the page, include:
- MIMIC transcription
- The Participant ID number
- Session number
- Date of recording
- approximate interview length (in minutes)
- number of pages of transcript

The participant ID number, session number and date of recording can all be found in the file name e.g 0041_100912_S4. 0041 is the participant ID. 100912 is the date of the recording- 10/09/2012. S4 is the session number- Session 4.

- Refer to participants within the transcript using the following codes:
- use a capital letter 'P' to refer to the Practitioner
- Use a capital letter 'C' to refer to the client
- Use participant code, followed by a colon : and tab stop, at the start of each new speakers turn.
- Number every line.
- Number all pages.
- Save the word document with the participant ID number, date of recorded session and session number followed by the word 'Transcript', e.g. '0041_100912_S4 Transcript.doc'. Please save the document in S:\SEWTU

Studies\WILMA\Intervention & Control\Intervention\MIPs\MI sessions

recordings\Transcription audio files in the folder called Transcriptions.

- Use transcription symbols as below:

(( ))	Use double round brackets to describe actions or give descriptions necessary to understand the transcript, e.g. ((QA0014 answers telephone))
( )	Words in round brackets indicate transcribers guess if speech is not clear, e.g. (the first thing I'd do)
(unclear)	The word 'unclear' in round brackets indicates speech is not clear and cannot be guessed
?:	If uncertain about who is speaking, use '?:' or, if guessing a speaker's identity, use the guessed participant code, followed by ?, e.g. P?: I guess it's kind of
…	Unfinished questions or statements that trail off indicate with ellipses e.g 'the Dr was saying that…'
WORD	Talk that is noticeably louder than other talk is typed in capital letters.
<u>word</u>	Talk that is emphasised is underlined

Study Name: WILMA
Participant ID Number: 0355
MI Session Date: 12/06/12
Session Number: 02
MI Session length: 00:47:36
Transcript length: 4 from 28 Pages

1. C: But um, I'm working on it slowly.

2. P: Yeah, so it's a sort of drip, drip effect.

3. C: I hope so, yeah.

4. P: Yeah and as you say, hopefully, as he sees the changes in you as well, cos it does sound like you're you're noticing lots of changes and you know, your confidence increasing as well…

5. C: Yeah.

6. P: then um I'm sure the children will sort of see that happening as well and have a positive effect on them.

7. C: Yeah, I hope so. Yeah.

8. P: Yeah. So what's what's next over the next sort of few weeks and months for you, then?   What, you know, what's the plan over all?

9. C: Um, My first focus is getting to fourteen stone nine

10. P: Hm mm

11. C: cos I was sixteen seven last night and fourteen stone nine's this sort of big milestone for me which I want to achieve, cos that was the weight I was when my mother died…

12. P: Ok.

13. C: Uum and I sort of feel as though once I get <u>there</u>, I've got, I've got control back ((laughter)).

14. P: Right.

15. C: and uh cos it was ten years ago and she died very suddenly of a heart attack, so everything, and then I had the three babies really close together as well…

16. P: Mmmm

17. C: So my weight <u>really</u> spiralled in those few years and so and then after that I just want to be as fit as I can, ready for us to go on holidays in October.

18. P: Ok.

19. C: So…

20. P: Ok, ok, so you've got a a a target weight in mind and that's taking you back to where you were really… before, before…

21. C: I want to lose more than that but I'm not really looking beyond that.

22. P: No, no so that's that's the next step, really is to get to that point and, as you were before, and then look at sort of uh what comes after that then.

23. C: Yeah.

24. P: And also you've got this holiday coming up which is a bit of a a sort of a goal as well then, isn't it?

25. C: Oh definitely, yeah.

26. P: to look and feel your best for that. Yeah.

27. C: Yeah.

28. P: So is it about more of the same that you do now or are you planning on doing anything different, anything extra, anything …? Changing anything?

29. C: Well, I'm going to start yoga tomorrow.

30. P: Are you?

31. C: So I'm really, I might have to go to aerobics first cos I'm so excited, I don't know how I'm gonna relax.

32. P: ((laughter)).

33. C: but I'm really looking forward to that.

34. P: Yeah?

35. C: and um no, no, you know, that's the only change really that I've got in mind apart from to continue to broaden the number of healthy foods that I enjoy…

36. P: Mmm

37. C: because, you know, I sort of perhaps twenty years ago, I had a very restricted what I liked and didn't like, you know…

38. P: Ok.

39. C: and I do feel as though my tastes are changing now.

40. P: Right.

41. C: Like half a year in of constantly eating properly…

42. P: Yes.

43. C: I even starting to find that I don't really like the sort of stuff that I used to like if I ((unclear)) off some of it, you know…

44. P: Yeah, that's interesting…

45. C: You know, it's not that I don't really like it but I don't really feel like when I was at my dad's last week, I had a few biscuits and stuff and I used to love biscuits and I eat loads of them and I just thought, "There's nothing to it really," it's just like a bit horrible and um…

46. P: So gradually your your taste has sort of changed, hasn't it?

47. C: Yeah, definitely starting to change and I think maybe part of it was that I wasn't having the emotional sort of connection to it before cos I used to always have a biscuits for everything like you know,

48. P: Ok.

49. C: Bored, happy, sad, whatever, whatever you're feeling, just you know, have a biscuit and you'll forget about it for a few seconds while you're eating it.

50. P: Hmmm.

51. C: and cos,

52. P: It's a comfort, uh comfort thing?

53. C: Yeah, so I don't do that any more? And yeah, I think that, that's made a big change.

54. P: And how, how do you deal with those things now then if you're not using food to sort of comfort yourself?

55. C: Uuum, well, I think if I was sort of feeling cold or tired or a bit fed up, perhaps I'd have a hot water bottle or a little lie-down in bed, perhaps.

56. P: Ok.

57. C: Or go for a walk or um you know if I was restless, I'd read although I find since I used to read quite a lot _more_ but since I've been doing all the exercise, as soon as I go upstairs, I khoooorrrr, ((laughter))…

58. P: ((laughter)) your jaw's still ((unclear))…

59. C: I can hardly do a page any more, yeah.

60. P: Yeah.

61. C: and um…

62. P: but it sounds like you found out uh strategies then…

63. C: Yeah…

64. P: for dealing with those sort of emotional needs rather than …

65. C: Yeah, I just don't really think about it, I suppose, you know if the emotions crop up you just deal with them…

66. P: Yeah. But …

67. C: You know, thinking about food…

68. P: Yeah and it sounds like, like you've created more positive habits than the negative ones of just sort of picking up biscuits…

69. C: There was one yesterday I noticed that my sister-in-law had been here with her children for a couple of hours and when they um left, and then I've suddenly felt really like starvingly hungry for junk food…

70. P: Ok.

71. C: and then I thought oh that's because, you know, I sort of I used to once guests used to leave,

72. P: Hmm

73. C: I'd go and eat something automatically cos I'd think oh, you know, I've been like careful not to be pigging out in front of people or whatever.

74. P: What ((unclear)) ….

75. C: … here. Yeah. So, you know, I'd make sure I wasn't hungry after they left or I'd be sort of, I don't know, rewarding myself in some way for something…

76. P: Hmm

77. C: I don't know what, with food, having survived a visit perhaps ((laughter)) I don't know and so um and it lasted, you know, for a good half an hour this feeling that, you know, they've gone and I'm on my own, I could eat something…

78. P: Hmm

79. C: but um I didn't, I waited and waited and did other things and then it went away and I thought "Oooh",

80. P: Fantastic.

81. C: Phew. You know, I got through it, cos I knew it was an emotional … thing.

82. P: I was gonna say, it sounds like you're really tapped into that, you identified what it was causing it and resisted that sort of…

83. C: Cos I knew I'd had a proper ((unclear))…

84. P: ((unclear))

85. C: I had baked potato and salad for lunch so I knew I shouldn't be physically hungry…

86. P: (She) didn't need to eat it. Yeah.

87. C: Yeah. So I'm trying to recognise those occasions…

88. P: When, when they come up.

89. C: Yeah,

90. P: and then it sounds it like…take steps…

91. C: Well, that's a fairly recent thing for me

92. P: Ok.

93. C: as well that I've started to realise …like

94. P: Yeah…

95. C: like inappropriate times when I would eat…you know…

96. P: Ok.

97. C: You know, so I'm still working on that.

98. P: So you're really tuned into that now, your radar is open to sort of those type of feelings.

Appendix C4-3 Planning talk coding system manual

Coding System

Conceptual model

Definition of a plan

A plan is an action for the future, it is volitional, involves thought before action and contains behaviours. Planning refers to the development of specific alternative behavioural paths by which a goal can be attained (Austin & Vancouver , 1996). They decide on a behavioural action, which is the ''how'' they will achieve the goal (Sniehotta, Scholz and Schwarzer, 2005). The "how" is the essential part of planning, the "when" and the "where" of a plan is optional for the definition of a plan, but does help to make the plan more specific. It can also involve details of actions or strategies to help the person negotiate potential obstacles (Sniehotta, Schwarzer, Scholz and Schu, 2005). If there is evidence of volition and thought before action from what the client has said then it is planning. This evidence may come in the form of the client informing the clinician of an activity they are doing or commenting on how an action is going. Examples of plans are:

C: "You, you don't have to go up to to fifteen sins, every sin is twenty calories and so I suppose that's three hundred so you're allowed calories of nice things, you know, chocolate, chips, whatever um but I I, you you there's a pl... ((woman's name)), lovely, marvellous um person who runs the club, says you have to learn to manage them. If you cut them out <u>completely</u>, you <u>cannot</u> go for the rest of your life <u>never</u> eating these things. You have, you have to <u>tame</u> them, yes? You <u>control</u> them."

P: "So you <u>tame</u> the the (bits), yeah"

C: "<u>Tame</u> them and <u>you</u> manage them. Don't let them manage you."

P: Hmm.

C: "So what I, so what I <u>must </u>do this week, is try and tame these things."

P: Ok. So that sounds like a really clear target.

"I'm going to eat breakfast <u>every</u> day."

"Uuum yeah I think we talked about it the night before that we were going to go shopping a
bit later than originally planned."

Definition of a Goal

A desired state that a person wants to achieve, where states are outcomes, events, or processes. (Austin & Vancouver , 1996). This desired stated must be in the future. These desired states could range from internal processes (e.g. to be less stressed), to desired outcomes (e.g., career success). The desired stats are indicated by the client using words such as "want", "aim", "desire", "aspire", "achieve" and "longing" etc. The goals will be states that the client wants to achieve that will help them reach the overall target goal. The goal is therefore contingent upon the performance of actions to achieve it.

Example of a goal are:

"I want to lose a pound a week"

"I want to go to the gym twice a week"

The difference between a Goal and a Plan.

The difference between plans and goals is determined by the "How" element of "How", "When" and "Where". The "how" is the essential part of planning that defines it, the "when" and the "where" of a plan is optional for the definition of a plan. The goal, however does not include the "How" element. Therefore if there is just a desired state mentioned then it is a goal. A goal and a plan can occur adjacent to each other within the same sentence.

Identifying the Target Goal

MI is used to identify and encourage change talk and to specify how these changes will take place therefore the therapist must have the target goal in mind, helping them to know which instances of client language to focus on. Before coding the session the coder should be made aware of the target goal. The target goal is overall what the client wants to achieve and is long term in nature. This target goal must always be kept in mind when coding the session and it must be specified in enough detail to allow the coder to discriminate it from other topics the client may talk about. There may be many behaviours that are linked to the target goal that can be included in the coding.

Examples of target goal are:

Weight Loss (target goal)

Weight Loss Maintenance

Stopping smoking

Increasing Fruit and vegetable intake

Adhering with medication regimen

Not stress eating

Coders should not infer a link between actions and the target goal unless it's clear from the context that the clients plan will help them move towards their target goal. For example "I plan on being less stressed work" would not be a plan towards a target goal of weight loss. However, if this was linked to stress eating then it would be. It would also be linked to the target goal if the therapist mentions the target goal and in response the client mentions a plan.

Assigning codes

P: Past Plan

C: Continuing Plan

F: Future Plan

H: Hypothetical Plan

GS: Goal Setting

Everything is coded on a degree on specificity: Low or High with the exception of past plans. With the exception of Hypothetical plan, Past plan and Continuing plan, everything is coded on a degree of commitment: Medium/Low or High.

Repetition of Plan or Goal

If the same plan/ goal is mentioned more than once throughout the session it is coded once only if it could be assigned two codes from the same category, such as both assigned at future plan code. This follows the MITI 3.1 as they state "Once a behaviour code is assigned once within the volley, it is not assigned again. A volley may contain only one of each behaviour code". The plan/goal that is coded is the plan/ goal with the highest commitment and specificity score assigned to the plan/ goal throughout the session. All other instances of the same plan/ goal that are mentioned and can be coded with the same category such as future plan are not coded. However, if the plan/ goal if retracted during the session then the plan/ goal is no longer coded.

For example

C: Well, my son's birthday is Monday…

P: Yeah.

C: and we'll be having a tea party although that's good cos it's on Monday, I'll be going to Slimming World at seven o'clock regardless to get weighed

P: Right.

C: even if I don't stay so that'll make me…

P: Ok.

C: perhaps I'll have the piece, slice of birthday cake when I get home, then… ((laughter))

P: give you an incentive…

C: and won't have it until the middle of the party. (future plan with high specificity and low commitment BUT NOT CODED as future plan repeated later in conversation) ((Phone rings)) Oh I'll ignore that …

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P: Yeah?

C: Yeah.

P: Ok. Yeah, so it's a bit of an incentive for you not to uh not to do that at the party then.

C: Yeah.

P: Yeah. So you feel like you have some form of a plan to deal with the food at your son's birthday. Sounds like you are going to try and have only a small amount of cake.

C: Yeah, I will definitely only have a small slice of cake after I come back from being weighed at slimming world. Slimming world will give me the motivation I need to stay on track with my diet. (CODED as Future plan with high specificity and high commitment).

The second time the future plan about cake is coded as this has been assigned the highest commitment and specificity code. The first time the future plan is mentioned it is not coded.

However if the same plan is repeated but can be assigned two different categories of plan then both times the plan is stated will be coded.

For example

If I go for a walk everyday then I would have to leave work early (hypothetical plan- coded), so I'm definitely going to start doing that (future plan- coded)

Client responses to clinician questions. Clients may respond to clinician questions/ statements with language that fits within any of the planning talk categories, and it should be coded as such. The fact that the clinician "set it up" with a particular sort of question or comment does not mean that the client's response is not planning talk. Even a one-word answer to a question may qualify for a planning talk code if the coder deems it to be a genuine response rather than simply a socially facilitating response. For Example:

Counsellor: So your planning on going to the gym more often specifically every Monday night after work and you are gonna bring your gym close with you to work.

Client: Yes that's right.

Definitions of Codes

Past Plan; These plans will consist of an expression of an action that has happened or a circumstance that previously existed. It must be a volitional plan that was made about a future action that has now been completed. There also must be evidence from what the client has said that there was volition or evidence of justification for the plan. Volition cannot be implied. To be coded the behaviour must clearly be one that is intended by the client to lead to the target goal. For example:

"I made pasta last week and instead of making a cheese sauce I made a tomato sauce so I didn't use my calorie allowance"

"I went to the gym last week with a friend from work"

Continuing plan: This is a strategy to continue the same action or event at a repeated frequency either continuously or at intervals. The plan has been made before the therapy session and will continue to be enacted in the future. To be coded the behaviour must clearly be one that is intended by the client to lead to the target goal. For Example

"When I'm at home I only snack on vegetables and that's something I'm gonna keep up"

"I've been making a packed lunch for work every day and I'm gonna make sure I keep doing that"

"I decided to take up knitting to distract myself from my craving which is really helping so I want to keep that up"

"I will walk everyday to work like I have been going as that really helps"

Future Plan: Is a plan that will or is likely to happen in the period of time after the therapy session. It must be a volitional plan that was made about a future action that has

not been completed yet. To be coded the behaviour must clearly be one that is intended by the client to lead to the target goal. For example

"I'm going to start going to the gym"

"I'm going to eat fruit every morning for breakfast"

Hypothetical: Is an idea about what the client could do to move towards the target goal but that the client is not committing to. A client could use the hypothetical to problem solve possible barriers they may come against. This must be an idea that could help them move towards the target goal or a way of moving past barriers that could stand in their way of completing the target goal. For Example:
"If I cut out pasta I could lose more weight"

"If I forget my gym kit I could go for a walk on my lunch break".

"If I make my lunches for work I think it could help me loss weight"

Goal Setting: An internal representation of desired states, where states are broadly construed as outcomes, events, or processes. (Austin & Vancouver , 1996). This desired stated must be in the future. Internally represented desired states range from internal processes (e.g. to be less stressed), to complex cognitive depictions of desired outcomes (e.g., career success). The desired stats are indicated by the client using words such as "want", "aim", "desire", "aspire", "achieve" and "longing" etc. The goals will be states that the client wants to achieve that will help them reach the overall target goal. The goal is therefore contingent upon the performance of actions to achieve it. The goal does not include a statement of what the actions are to achieve it (the "How") as that defines a plan. When coding goal setting be aware that when the word "if" occurs before a goal e.g. "If only I could be 10 stone" this is not coded as a goal. The client is not stating a goal they want to achieve.

"I want to lose a pound a week"

"I want to go to the gym twice a week"

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Rating the Degree of Commitment

Every time Future or Goal Setting are coded a degree of commitment must be assigned: Medium/Low or High. Hypothetical does not get assigned a degree of commitment as the nature of this implies the clients are not committed. Past also does not get assigned a degree of commitment as due to the nature of the language used when people talk about past plans one would not be rating the degree of commitment to the plan but the success or failure of the plan. A person can be very committed to a plan but unforeseen events may stop the person completing the plan counting it as a failure. Continuing is also not rated on commitment as the plan is continuing to happen. Degree of commitment implies an intention or an obligation to complete the plan/ goal made by the client. The client is pledging to complete a certain behavioural act. This includes starting a certain behaviour as well as stopping something, such a giving up chocolate. This can be expressed directly via a committing verb, or indirectly. For example:

"I *swear* I will stop this" "Swear" is strong committing verb, coded High

"Nothing is going to stop me this time" This statement has no committing verb, but it indirectly implies commitment and is also coded High

There are separate commitment ratings scales for plans and goals as plans are about going to an action where are goals are about wanting to achieve something. These lead to different commitment verbs being used.

Commitment rating for plans

High: Statements should indicate that the client is going to complete the plan made. It should indicate that they have strong intentions to change their behaviour.

High Commitment Words

I guarantee	I know
I will	I am devoted to
I promise	I pledge to
I vow	I agree to
I shall	I am prepared to
I give my word	I intend to
I assure	I am ready to

I dedicate myself	
	I've got to
	I know I can
	I'll do
	I definitely will
	I'm going to
	I just got to
	I'm not going to
	I'm definitely not going to
	There is no way

"Well, I I know now, I'll be more structured"- Future

"I took my portion sizes um and I need to get myself organised a bit more with my food know what I'm having for the following day and get it prepared."- Future

"I'd <u>love</u> to get it off to go this wedding"- Goal setting.

Medium/ low: Statements should indicate that the person may complete the plan however they have not fully pledged to change their behaviour. They may also be wanting to see how things go and haven't fully made up their mind.

Medium/ Low Commitment Words

I look forward to	I propose	I suppose I will
I consent to	I am predisposed	I imagine I will
I would like to	I anticipate	I suspect I will
I plan to	I predict	I contemplate
I resolve to	I presume	I guess I will
I expect to	I mean to	I wager
I concede to	I foresee	I will see (about)
I declare my intention to	I envisage	
I favour	I assume	I could do
I endorse	I bet	Perhaps I could
I believe	I hope to	Hopefully I can

I accept	I will risk	Maybe I
I volunteer	I will try	I think
I aim	I think I will	I might not
I aspire		Possibly I will not

"I think for the moment, I'd want to go back to weighing"- Future

"So maybe that's what I need to step up a bit" –Future

"Yes, and plan ah… and plan, yeah, factor in the whole day, I suppose" -Future

Commitment scale for goals

High: Statements should indicate that the client is very committed to the goal, wants to achieve it or shows how important the goal is to the client. This can be expressed through the client language or through the client rating on a scale of 1 to 10 how important the goal is. If the client rates the goal as a 6 or higher then is it is rated as high commitment.

High Commitment Words

I really want	I would love to
I truly want	I absolutely want to
I desperately want to	I undeniably want to
I definitely want to achieve	It's really important
I want to	I have to
	I definitely don't want to
	It's very important I don't

"I definitely want to lose 1 stone"

"I truly want to eat healthier"

Medium/Low: Statements should indicate that the client is not as committed to the goal and is less important to the client. This can be expressed through the client language or

through the client rating on a scale of 1 to 10 how important the goal is. If the client rates the goal as 1-5 then is it is rated as high commitment.

Medium/Low Commitment Words

I would like to	I want to possibly
I kind of want to	I suppose
I might want to	
Maybe I would like to	

"I'd like to get to about twelve stone six, I would"

Rating the Degree of Specificity

Every time, Continuing, Future, Hypothetical or Goal Setting are coded a degree of specificity must be assigned: Low or High. Past plans are not rated on specificity. There are separate specificity rating scales for plans are goals are they comprise of different components and does not include a "how". Degree of specificity implies a clearly defined set of events that precisely identify when and how and possibly where an action will take place.

Specificity rating for plans

High: Statements must include "when" a time scale to achieve it in, the time the plan will occur or it could be a cue, a state of being or a circumstance e.g being stressed or when they are at work. It should also include "how" they are going to achieve what they want. "Where" the plan takes place can be included as well but will not lead to the plan being rated as high specificity without the presence of "when". The wording of the "when" should be more specific than "sometime", "at some point" or "in the future" for it to be coded as the "when" of a plan. If however the client says "this year" or "this summer" etc. then that is coded as "when". If a client says that they are never going to do something again/ has stopped doing something or is never going to go back to a certain state that is also coded as "when".

"I took my portion sizes um and I need to get myself organised a bit more with my food. Know what I'm having for the following day and get it prepared"- Future

C: Like like in the night then to watch my portion, I'll weigh my rice ready...

P: Ok.

C: and things. Put it in a saucepan ready so when I come in from work or anything, there's

no looking for what I've got to have. -Future

 "If I could eat carrots instead of biscuits at my 3pm tea break at work then I could lose some weight" -Hypothetical

P:Ok how else did you lose this weight?

C:Um, ex, well I uh line dance three times a week.

P:Wow.

C: and that's usually um an hour and a half. It's always like a two hour

session but if you have a coffee or a tea or if you're there a bit late, but I'm always

dancing for an hour and a half…

P:Hmm mm

C:and that's three times a week. - Continuing

Low: Statements must include "how" the client is going to achieve what they want. "Where" the plan takes place can be included as well but will not lead to the plan being rated as high specificity. Statements that include the "When", a time scale to achieve it in/ the time the plan will occur, should be rated as high.

 "I'm going to eat more fruit" Future plan

"I'm going to continue to be more active" Continuing plan

"Well, I I know now, I'll be more structured"- Future

Specificity rating for goals

High: Statements for rating goals as high must include "when" the goal should be achieved by. The wording of the "when" should be more specific than "sometime", "at some point" or "in the future" for it to be coded as the "when" of a plan. If however the

client says "this year" or "this summer" etc then that is coded as "when". "Where" the goal takes place can be included as well but will not lead to the goal being rated as high specificity without the presence of "when".

"I want to lose 1 stone by my holiday"

"I want to start going to the gym on Mondays"

"I want to eat fruit daily"

Low: Statements for ratings goals as low will only include the goal that the person wants to achieve. "Where" the goal takes place can be included as well but will not lead to the goal being rated as high specificity.

"I want to lose 3 pounds"

"I want to go to the gym"

Appendix C4-4 Coding system training version 1

Slide 1

Appendix C4-4: Coding system training
version 1

Slide 2

MIMIC STUDY

Understanding the Therapeutic Process:
Mechanisms of Motivational Interviewing in Weight
Loss Maintenance

Miss Lauren Copeland

Supervisors
Dr Sharon Simpson, Prof Stephen Rollnick
Dr Rachel McNamara and Dr Mark Kelly

wilma

Slide 3

Study Aims

• *Phase one*- To define planning talk used by the client in an MI session.

• *Phase two* -To identify:
  ◦ Different types of planning talk within the MI sessions.
  ◦ If planning talk is related to weight loss maintenance outcomes.
  ◦ If more detailed or specific planning is associated with better weight loss maintenance outcomes
  ◦ If making plans leads to better outcomes than just goal setting

Slide 4

Aim of The Presentation

- To test the reliability of the planning talk coding system.
- You will be asked to code 15 examples using the coding system.
- You will then identify plans and goals within a four page transcript.

Slide 5

Planning talk coding system

Slide 6

Identifying the Target Goal

- The target goal is overall what the client wants to achieve and is long term in nature and should be known before coding.
- This target goal must be specified in enough detail for the coder to identify.
- Examples of target goal are:
  Weight Loss (target goal)   Adhering with medication
  Weight Loss Maintenance   regimen
  Stopping smoking   Stopping drinking

- Coders should not infer a link between actions and the target goal.
- For example "I plan on being less stressed work" would not be a plan towards a target goal of weight loss.

G@AL

- MI -identify and encourage change talk and to specify how these changes will take place.
- Therapist must have the target goal in mind- know which instances of client language to focus on.

- This target goal always be kept in mind -specified in enough detail to allow the coder to discriminate it from other topics the client may talk about.

•Coders should not infer a link between actions and the target goal unless it's clear from the context that the clients plan will help them move towards their target goal. For example "I plan on being less stressed work" would not be a plan towards a target goal of weight loss.

•However, if this was linked to stress eating then it would be.

Slide 7

Assigning codes to the utterances

- The flowing codes can be assigned to the session:

- P: Past Plan
- C: Continuing Plan
- F: Future Plan
- H: Hypothetical Plan
- GS: Goal Setting

- Every code is assigned a degree of specificity: Low or High with the exception of past plans.

- With the exception of Hypothetical, Past and Continuing plans, every code is assigned a degree of commitment: Medium/Low or High.

Slide 8

Repetition of Plan/ Goal

- If the same plan/ goal is mentioned more than once throughout the session it is coded once only if it could be assigned two codes from the same category, such as both assigned at future plan code.

- The plan/goal that is coded is the plan/ goal with the highest commitment and specificity score assigned to the plan/ goal throughout the session.

- All other instances of the same plan/ goal that are mentioned and can be coded with the same category such as future plan are not coded.

- **However**, if the plan/ goal if retracted during the session then the plan/ goal is no longer coded.

Slide 9

Repetition of Plan/ Goal

- For example
- C: Well, my son's birthday is Monday and we'll be having a tea party although that's good cos it's on Monday, I'll be going to Slimming World at seven o'clock regardless to get weighed even if I don't stay so that'll make me...
- P: Ok.
- C: **perhaps I'll have the piece, slice of birthday cake when I get home, then...** ((laughter))
- P: give you an incentive...
- C: **and won't have it until the middle of the party.** (future plan with high specificity and low commitment **BUT NOT CODED** as future plan repeated later in conversation)
- P: Yeah. So you feel like you have some form of a plan to deal with the food at your son's birthday. Sounds like you are going to try and have only a small amount of cake.
- C: **Yeah, I will definitely only have a small slice of cake after I come back from being weighed at slimming world. Slimming world will give me the motivation I need to stay on track with my diet. (** CODED as Future plan with high specificity and high commitment).

- The second time the future plan about cake is coded as this has been assigned the highest commitment and specificity code. The first time the future plan is mentioned it is not coded.

- However if the same plan is repeated but can be assigned two different categories of plan then both times the plan is stated will be coded.
- For example
- C: If I go for a walk everyday then I would have to leave work early (hypothetical plan- **coded**),
- P: Right ok so that sounds like you are thinking about possibilities.
- C: Actually I'm definitely going to start doing that (future plan- **coded**)

Slide 10

Client responses to clinician questions

- Clients responses to clinician questions/ statements should be coded as planning talk if the clinician's language refers to planning.

- A one-word answer to a question may be coded as planning talk code if it's a genuine response.

- For Example:
- Counsellor: So your planning on going to the gym more often specifically every Monday night after work and you are gonna bring your gym clothes with you to work.
  Client: Yes that's right.

EVERYBODY HATES ME

- Clients may respond to clinician questions/ statements with language that fits within any of the planning talk categories, and it should be coded as such.

- Even a one-word answer to a question may qualify for a planning talk code if the coder deems it to be a genuine response rather than simply a socially facilitating response

Slide 11

Planning talk coding system

Slide 12

Definition of a Plan

- A plan is an action for the future, it is volitional, involves thought before action and contains behaviours.

- Planning is made up of "When", "Where" and "How".

- It can also involve details of actions or strategies to help the person negotiate potential obstacles (Sniehotta, Schwarzer, Scholz and Schu, 2005).

- Examples:
- "My portion sizes, I know I can change that."

- "I think I definitely need to be a bit more active than I have been."

- "Yeah I think we talked about it the night before that we were going to go shopping a bit later than originally planned."

• Planning -the development of specific alternative behavioural paths by which a goal can be attained (Austin & Vancouver , 1996).

• They decide on a behavioural action- "how" they will achieve the goal (Sniehotta, Scholz and Schwarzer, 2005). The "how" is the essential part of planning.

• "when" and the "where" of a plan is optional for the definition of a plan, does make it more specific.

• If there is evidence of volition and thought before action from what the client has said then it is planning.

• This evidence = the client informing the clinician of an activity they are doing or commenting on how an action is

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going.

Slide 13

•An internal representation of desired states - outcomes, events, or processes. (Austin & Vancouver , 1996).

•This desired stated must be in the future.

•states range from internal processes (e.g. to be less stressed), to complex cognitive depictions of desired outcomes (e.g., career success).

•The goals will be states that the client wants to achieve that will help them reach the overall target goal. The goal is therefore contingent upon the performance of actions to achieve it.

Slide 14

> **The difference between a Goal and a Plan.**
> - The difference between plans and goals is determined by the "How" element of "How", "When" and "Where".
> - The "how" is the essential part of planning that defines it, the "when" and the "where" of a plan is optional for the definition of a plan.
> - The goal, however does not include the "How" element. Therefore if there is just a desired state mentioned then it is a goal.
> - A goal and a plan can occur adjacent to each other within the same sentence.

If a person has made a plan/goal in a previous session as indicated by them or the counsellor and they report they did not enact the plan/goal it is still coded as a plan/goal.

When coding a plan/goal think about what it is the client wants to achieve/ what action they want to do. This will help identify and separate plans/goals.

It can also help to read ahead to work out what the plan/ goal is about or whether it should be coded or not.

Slide 15

> **Past Plan**
> - An action that has happened or a state that previously existed.
> - A evidence based volitional plan that was made about a future action that has now been completed.
> - For example:
> - "I made pasta last week and instead of making a cheese sauce I made a tomato sauce so I didn't use my calorie allowance"
> - "I went to the gym last week with a friend from work"

• These plans will consist of an expression of an action that has happened or a state that previously existed.

• A volitional plan that was made about a future action that has now been completed.

• Evidence from what the client has said that there was volition or evidence of justification for the plan.

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•Volition cannot be implied.

•clearly be behaviour that is intended by the client to lead to the target goal.

Slide 16

•This is a strategy to continue the same action or event at a repeated frequency either continuously or at intervals.

•The plan has been made before the therapy session and will continue to be enacted in the future.

•To be coded the behaviour must clearly be one that is intended by the client to lead to the target goal.

Slide 17

Future Plan

- Is a plan that will or is likely to happen in the period of time after the therapy session.

- It must be a volitional plan that was made about a future action that has not been completed yet.
- For example

- "I'm going to start going to the gym"

- "I'm going to eat fruit every morning for breakfast"

FUTURE ▶

•Is a plan that will or is likely to happen in the period of time after the therapy session.

•It must be a volitional plan that was made about a future action that has not been completed yet.

•To be coded the behaviour must clearly be one that is intended by the client to lead to the target goal

Slide 18

Hypothetical Plan

- Is an idea about what the client **could do** to move towards the target goal but that the client is not committing to.

- An idea that could help them move towards the target goal or a way of moving past barriers that could stand in their way of completing the target goal.

- For Example:
- "If I cut out pasta I could lose more weight"

- "If I forget my gym kit I could go for a walk on my lunch break".

•Is an idea about what the client could do to move towards the target goal but that the client is not committing to.

•A client could use the hypothetical to problem solve possible barriers they may come against.

•This must be an idea that could help them move towards the target goal or a way of moving past barriers that could stand in their way of completing the target goal

Slide 19

Rating the Degree of Commitment

- Every time Future plan or Goal Setting are coded a degree of commitment must be assigned: Medium/Low or High.

- Hypothetical, Past and Continuing plans do not get assigned a degree of commitment.

- Degree of commitment implies an intention to complete the plan. This can be expressed directly via a committing verb, or indirectly.

- There are separate commitment ratings scales for plans and goals.

• Hypothetical Not assigned as the nature of this implies the clients are not committed.

• Past Not get assigned due to the nature of the language used when people talk about past plans one would not be rating the degree of commitment to the plan but the success or failure of the plan.

• A person can be very committed to a plan but unforeseen events may stop the person completing the plan counting it as a failure.

• Continuing is also not rated on commitment as the plan is continuing to happen.

• This can be expressed directly via a committing verb, or indirectly. For example:

• "I *swear* I will stop this" "Swear" is strong committing verb, coded High

• "Nothing is going to stop me this time" This statement has no committing verb, but it indirectly implies commitment and is also coded High

• Separate scales as plans are about going to an action where are goals are about wanting to achieve

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something. These lead to different commitment verbs being used.

Slide 20

Rating High Commitment

- **High Plans**: Statements should indicate that the client is going to complete the plan made. It should indicate that they have strong intentions to change their behaviour.
- Table of High Commitment language on page 2 of coding system
- For example
  "I took my portion sizes um and I need to get myself organised a bit more with my food know what I'm having for the following day and get it prepared."- Future plan

- **High Goals**: Statements should indicate that the client is very committed to the goal, wants to achieve it or shows how important the goal is to the client. This can be expressed through the client language or through the client rating on a scale of 1 to 10 how important the goal is. If the client rates the goal as a 6 or higher then is it is rated as high commitment.
- Table of high commitment language on page 3
- Examples
- "I definitely want to lose 1 stone"
- "I truly want to eat healthier"

Slide 21

Rating Medium/Low commitment

- **Medium/ low Plans**: Statements should indicate that the person may complete the plan however they have not fully pledged to change their behaviour. They may also be wanting to see how things go and haven't fully made up their mind.
- Medium/ Low Commitment Words table on page 2
- Examples
- "I think for the moment, I'd want to go back to weighing"- Future plan
- "So maybe that's what I need to step up a bit" –Future plan

- **Medium/Low Goals**: Statements should indicate that the client is not as committed to the goal and is less important to the client. This can be expressed through the client language or through the client rating on a scale of 1 to 10 how important the goal is. If the client rates the goal as 1-5 then is it is rated as high commitment.
- Table of medium/low commitment language on page 3
- Example
- "I'd like to get to about twelve stone six, I would"

Slide 22

Rating the Degree of Specificity

- Every time, Continuing, Future, Hypothetical plans or Goal Setting are coded a degree of specificity must be assigned: Low or High.

- Past plans are not rated on specificity.

- Degree of specificity implies a clearly defined set of events that precisely identify when and how and possibly where an action will take place.

- There are separate specificity rating scales for plans and goals.

•Every time, Continuing, Future, Hypothetical or Goal Setting are coded a degree of specificity must be assigned: Low or High.

•Past plans are not rated on specificity.

•There are separate specificity rating scales for plans are goals are they comprise of different components and does not include a "how".

•Degree of specificity implies a clearly defined set of events that precisely identify when and how and possibly where an action will take place.

Slide 23

Rating the Degree of Specificity

- **High Plans**: Statements must include "when" a time scale to achieve it in/ the time the plan will occur and "how" they are going to achieve what they want.
- The wording of the "when" should be more specific than "sometime", "at some point" or "in the future" for it to be coded as the "when" of a plan.
- Examples
- "I took my portion sizes um and I need to get myself organised a bit more with my food. Know what I'm having for the following day and get it prepared"- Future
- "If I could eat carrots instead of biscuits at my 3pm tea break at work then I could lose some weight" –Hypothetical

- **High Goals**: Statements for rating goals as high must include "when" the goal should be achieved by.
- The wording of the "when" should be more specific than "sometime", "at some point" or "in the future" for it to be coded as the "when" of a plan. If however the client says "this year" or "this summer" etc then that is coded as "when".
- Examples
- "I want to lose 1 stone by my holiday"
- "I want to start going to the gym on Mondays"

•High Plans: Statements must include "when" a time scale to achieve it in/ the time the plan will occur and "how" they are going to achieve what they want.

•"Where" the plan takes place can be included but Not rated as high specificity without the presence of "when".

•If however the client says "this year" or "this summer" etc then that is coded as "when".

•High Goals: Statements for rating goals as high must include "when" the goal should be achieved by.

•If however the client says "this year" or "this summer" etc. then that is coded as "when".

•"Where" the goal takes place can be included but Not rated as high specificity without the presence of "when".

Slide 24

Rating the Degree of Specificity

- **Low Plans**: Statements must include "how" the client is going to achieve what they want.
- Statements that include the "When", a time scale to achieve it in/ the time the plan will occur, should be rated as high.
- Examples
- "I'm going to eat more fruit"-Future plan
- "I'm going to continue to be more active"-Continuing Plan

- **Low Goals**: Statements for ratings goals as low will only include the goal that the person wants to achieve.
- Examples
- "I want to lose 3 pounds"
- "I want to go to the gym

•Low plans: Statements must include "how" the client is going to achieve what they want.

•"Where" the plan takes place can be included but not lead to the plan being rated as high specificity.

•Statements that include the "When", a time scale to achieve it in/ the time the plan will occur, should be rated as high.

•Low Goals: Statements for

ratings goals as low will only include the goal that the person wants to achieve.

•"Where" the goal takes place can be included but Not lead to the goal being rated as high specificity.

Slide 25

Planning talk coding system
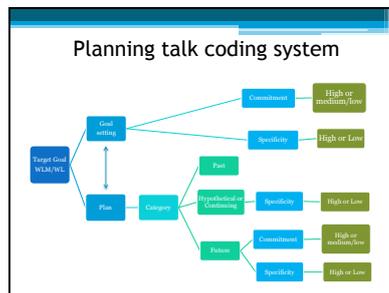
Slide 26

Conclusions

• This coding system will hopefully identify planning talk that is related to weight maintenance outcomes.

• Aim of presentation

▫ To test the reliability of the planning talk coding system.

▫ You will be asked to code 15 examples using the coding system.

▫ You will then identify plans and goals within a four page transcript.

THANK YOU FOR LISTENING

Appendix C4-5: Letter to recruit participants for reliability testing

Hi

I'm doing a PhD in association with the WILMA study and I am looking for 10 volunteers to help me test a coding system for my PhD and who would like to earn a little **extra cash**. If you are interested you will be taught as part of a group how to use the coding system and then you will apply the coding system to some data. This whole process will take about 2 hours and you will be compensated for your time with **£40 worth of love to shop vouchers**. This is a quick and easy way to get some extra money to treat yourself in the shops :).

The training will take place in April with a date decided upon via a doodle poll of those interested in taking part.

If you are interested in taking part or have any questions please email me back and I will be in contact with you to organise a date in April that is suitable for all the volunteers

Looking forward to hearing from you
Lauren Copeland

Appendix C4-6 Coding system training version 2

Slide 1

Appendix C4-6: Coding system training version 2

Slide 2

MIMIC STUDY

Understanding the Therapeutic Process:
Mechan**I**sms of **M**otivational **I**nterviewing in Weight Loss Maintenan**C**e

Miss Lauren Copeland

Supervisors
Dr Sharon Simpson, Prof Stephen Rollnick
Dr Rachel McNamara and Dr Mark Kelly

wilma

Slide 3

Background
Obesity
• Obesity is a key public health issue in the UK.

• Weight loss maintenance is a crucial research area as most dieters regain the weight lost.

• Maintaining a weight loss of 5% can reduced the risk of diabetes and cardiovascular disease.

Nearly a quarter of adults being obese.

Weight loss maintenance is a crucial research area as most dieters regain about one third of weight lost during the next year and are usually back to their baseline weight in three to five years (Wadden et al., 2002).

Slide 4

> **Background**
> **Motivational Interviewing**
> - A meta analyses of Motivational Interviewing (MI) shows it to be an effective technique to help people change their physical activity, diet & weight loss behaviour.
> - The key processes with MI engaging, evoking, focusing and planning.
> - We currently do not understand how MI works.

Meta analyses of Motivational Interviewing (MI) show it to be an effective technique to help people change their physical activity, diet & weight loss behaviour.

There is some evidence in the behaviour change literature that planning may be important.

We currently do not understand how MI works, but identifying in-session indicators of client outcomes is important in determining the mechanisms by which MI works, e.g. the language a client uses.

Slide 5

> **Planning and Motivational Interviewing**
> - MI has been shown to help people lose weight and maintain this weight loss up to a year at follow up. However, we currently do not understand how MI works.
> - Identifying in-session indicators of client outcomes is important in determining the mechanisms by which MI works, e.g. the language a client uses.
> - One of the possible mechanisms is clients making plans which has been recently added as a process of MI.
> - Planning has been shown to help bridge the gap between intention and behaviours in behaviour change research.

Slide 6

Study Aims

- *Phase one*- To define planning talk used by the client in an MI session.

- *Phase two* -To identify:
  ○ Different types of planning talk within the MI sessions.
  ○ If planning talk is related to weight loss maintenance outcomes.
  ○ If more detailed or specific planning is associated with better weight loss maintenance outcomes
  ○ If making plans leads to better outcomes than just goal setting

Slide 7

Aim of The Presentation

- To test the reliability of the planning talk coding system.

- You will be asked to code 15 examples using the coding system.

- You will then identify plans and goals within a three page transcript.

Slide 8

Strategies for losing weight or maintaining weight

- Diet- cutting out foods, weighing foods, eating breakfast, using low fat sprays or portion control, not having bad food in the house or planning what they are going to have for every meal and only buy they food they need from the shops.

- Exercise- gym, walking or lifting cans of beans

- Self-monitoring- weighing themselves on a regular basis. This can include weighing themselves and sending it into the WILMA study.

- Increasing confidence in themselves/ changing perceptions of themselves e.g. realising they are thin.

- Distracting themselves from snacking with other activities or removing themselves from temptation.

- Recognising when they are hungry and when they are eating because they are bored.

- If the client has a bad day the plan could be to start fresh the next day with the diet rather than give up altogether.

Slide 9

Planning talk coding system
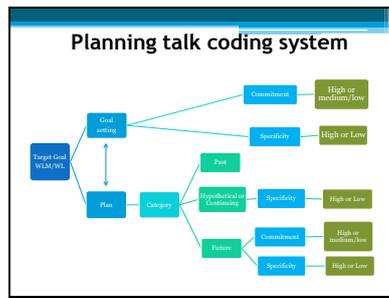
Slide 10

Identifying the Target Goal

- The target goal is overall what the client wants to achieve and is long term in nature and should be known before coding.
- This target goal must be specified in enough detail for the coder to identify.
- Examples of target goal are: Adhering with medication
  Weight Loss (target goal)   regimen
  Weight Loss Maintenance   Stopping drinking
  Stopping smoking

- Coders should not infer a link between actions and the target goal.
-         For example "I plan on being less stressed work" would not be a plan towards a target goal of weight loss.

GOAL

•MI -identify and encourage change talk and to specify how these changes will take place.

•Therapist must have the target goal in mind- know which instances of client language to focus on.

•This target goal always be kept in mind -specified in enough detail to allow the coder to discriminate it from other topics the client may talk about.

•Coders should not infer a link between actions and the target goal unless it's clear from the context that the clients plan will help them move towards their target goal. For example "I plan on being less stressed work" would not be a plan towards a target goal of weight loss.

•**However, if this was linked to stress eating then it would be.**

Slide 11

Assigning codes to the utterances

- The flowing codes can be assigned to the session:

- P: Past Plan
- C: Continuing Plan
- F: Future Plan
- H: Hypothetical Plan
- GS: Goal Setting

- Every code is assigned a degree of specificity: Low or High with the exception of past plans.

- Only Future plans and Goal setting are assigned a degree of commitment: Medium/Low or High.

Slide 12

Repetition of Plan/ Goal

- If the same plan/ goal is mentioned more than once throughout the session it is coded once only if it could be assigned two codes from the same category, such as both assigned at future plan code.

- The plan/goal that is coded is the plan/ goal with the highest commitment and specificity score assigned to the plan/ goal throughout the session.

- All other instances of the same plan/ goal that are mentioned and can be coded with the same category such as future plan are not coded.

- **However**, if the plan/ goal if retracted during the session then the plan/ goal is no longer coded.

Slide 13

Repetition of Plan/ Goal

- For example
- C: Well, my son's birthday is Monday and we'll be having a tea party although that's good cos it's on Monday, I'll be going to Slimming World at seven o'clock regardless to get weighed even if I don't stay. **Perhaps I'll have the piece, slice of birthday cake when I get home, and try and only have the one piece of cake.** (future plan with high specificity and low commitment **BUT NOT CODED** as future plan repeated later in conversation)

- P: Yeah. So you feel like you have some form of a plan to deal with the food at your son's birthday. Sounds like you are going to try and have only a small amount of cake.
- C: **Yeah, I will definitely only have a small slice of cake after I come back from being weighed at slimming world. Slimming world will give me the motivation I need to stay on track with my diet. (CODED)** as Future plan with high specificity and high commitment).

- The second time the future plan about cake is coded as this has been assigned the highest commitment and specificity code. The first time the future plan is mentioned it is not coded.

- However if the same plan is repeated but can be assigned two different categories of plan then both times the plan is stated will be coded.
- For example
- C: If I go for a walk everyday then I would have to leave work early (hypothetical plan- **coded**),
- P: Right ok so that sounds like you are thinking about possibilities.
- C: Actually I'm definitely going to start doing that (future plan- **coded**)

Slide 14

Client responses to clinician questions

- Clients responses to clinician questions/ statements should be coded as planning talk if the clinician's language refers to planning.

- A one-word answer to a question may be coded as planning talk code if it's a genuine response.

- For Example:
- Counsellor: So your planning on going to the gym more often specifically every Monday night after work and you are gonna bring your gym clothes with you to work.
  Client: Yes that's right.

  EVERYBODY HATES ME

•Clients may respond to clinician questions/ statements with language that fits within any of the planning talk categories, and it should be coded as such.

•Even a one-word answer to a question may qualify for a planning talk code if the coder deems it to be a genuine response rather than simply a socially facilitating response

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Slide 15

Planning talk coding system

Slide 16

Definition of a Plan

- A plan is an action for the future, it is volitional, involves thought before action and contains behaviours.

- Planning is made up of "How" and can also include "when" and "where".

- It can also involve details of actions or strategies to help the person negotiate potential obstacles.

- Examples:
- "My portion sizes, I'm going to change that."

- "I think I definitely need to be a bit more active than I have been."

- "I plan out every week what I am going to buy from the shops so I know what I'm eating each week."

•Planning -the development of specific alternative behavioural paths by which a goal can be attained (Austin & Vancouver , 1996).

•They decide on a behavioural action- "how" they will achieve the goal (Sniehotta, Scholz and Schwarzer, 2005). The "how" is the essential part of planning.

•"when" and the "where" of a plan is optional for the definition of a plan, does make it more specific.

•If there is evidence of volition and thought before action from what the client has said then it is planning.

•This evidence = the client informing the clinician of an activity they are doing or commenting on how an action is going.

Slide 17

Goal Setting

- It is a desired state the client wants to achieve e.g. to be less stressed or to weigh less. This desired stated must be in the future.
- The desired states are indicated by the client using words such as "want", "aim", "desire", "aspire", "achieve" and "longing" etc.
- **The goal does not include a statement of what the actions are to achieve it (the "How") as that defines a plan.**
- When coding goal setting be aware that when the word "if" occurs before a goal e.g. "If only I could be 10 stone" this is not coded as a goal.

- For example
- "I want to lose a pound a week"
- "I want to go to the gym twice a week"
- "I don't want to put all the weight back on"
- "I would like to be about 12 stone"

GOAL SETTING
SPECIFIC
MEASURABLE
ATTAINABLE
RELEVANT
TIME-BOUND

•An internal representation of desired states - outcomes, events, or processes. (Austin & Vancouver , 1996).

•This desired stated must be in the future.

•states range from internal processes (e.g. to be less stressed), to complex cognitive depictions of desired outcomes (e.g., career success).

•The goals will be states that the client wants to achieve that will help them reach the overall target goal. The goal is therefore contingent upon the performance of actions to achieve it.

Slide 18

The difference between a Goal and a Plan.

- The difference between plans and goals is determined by the "How" element of "How", "When" and "Where".

- The "how" is the essential part of planning that defines it, the "when" and the "where" of a plan is optional for the definition of a plan.

- The goal, however does not include the "How" element. Therefore if there is just a desired state mentioned then it is a goal.

- A goal and a plan can occur adjacent to each other within the same sentence.

If a person has made a plan/goal in a previous session as indicated by them or the counsellor and they report they did not enact the plan/goal it is still coded as a plan/goal.

When coding a plan/goal think about what it is the client wants to

achieve/ what action they want to do. This will help identify and separate plans/goals.

It can also help to read ahead to work out what the plan/ goal is about or whether it should be coded or not.

Slide 19

Slide 20

Slide 21

Slide 22

•These plans will consist of an expression of an action that has happened or a state that previously existed.

•A volitional plan that was made about a future action that has now been completed.

•Evidence from what the client has said that there was volition or evidence of justification for the plan.

•Volition cannot be implied.

•clearly be behaviour that is intended by the client to lead to the target goal.

Slide 23

Continuing Plan

- This is a strategy to continue the same action or event at a repeated frequency either continuously or at intervals.

- The plan has been made before the therapy session and will continue to be enacted in the future.

- For Example
- "When I'm at home I only snack on vegetables and that's something I'm gonna keep up"

- "I weight myself every day"

- "We plan out when we are going to eat to make sure I only eat healthy food.
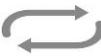
•This is a strategy to continue the same action or event at a repeated frequency either continuously or at intervals.

•The plan has been made before the therapy session and will continue to be enacted in the future.

•To be coded the behaviour must clearly be one that is intended by the client to lead to the target goal.

Slide 24

Future Plan

- Is a plan that will or is likely to happen in the period of time after the therapy session.

- It must be a volitional plan that was made about a future action that has not been completed yet.
- For example

- "I'm going to avoid carbs and eat more vegetables instead when I'm on holiday "

- "I'm going to eat fruit every morning for breakfast"

- "I'm going to start doing jigsaw puzzles in the evening so I keep active and away from the kitchen"

•Is a plan that will or is likely to happen in the period of time after the therapy session.

•It must be a volitional plan that was made about a future action that has not been completed yet.

•To be coded the behaviour must clearly be one that is intended by the client to lead to the target goal

Slide 25

Hypothetical Plan

- Is an idea about what the client **could do** to move towards the target goal but that the client is not committing to. "If I did this activity then it would help with my weight".

- An idea that could help them move towards the target goal or a way of moving past barriers that could stand in their way of completing the target goal.

- For Example:
- "If I cut out pasta I could lose more weight"

- "If I forget my gym kit I could go for a walk on my lunch break".

- "One idea to keep me busy would be if I join a 5 a side football team"

- "If I can find my old sewing kit I could take up sewing to stop me snacking"

•Is an idea about what the client could do to move towards the target goal but that the client is not committing to.

•A client could use the hypothetical to problem solve possible barriers they may come against.

•This must be an idea that could help them move towards the target goal or a way of moving past barriers that could stand in their way of completing the target goal

Slide 26

Planning talk coding system
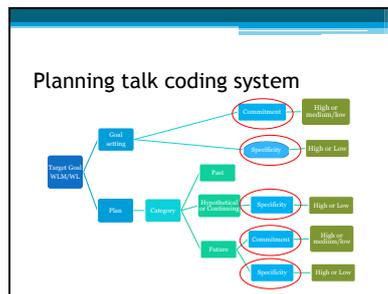
Slide 27

Rating the Degree of Commitment

- Every time Future plan or Goal Setting are coded a degree of commitment must be assigned: Medium/Low or High.

- Hypothetical, Past and Continuing plans do not get assigned a degree of commitment.

- Degree of commitment implies an intention to complete the plan. This can be expressed directly via a committing verb, or indirectly.

- "Nothing is going to stop me this time" This statement has no committing verb, but it indirectly implies commitment and is also coded High

- There are separate commitment ratings scales for plans and goals.

•Hypothetical Not assigned as the nature of this implies the clients are not committed.

•Past Not get assigned due to the nature of the language used when people talk about past plans one would not be rating the degree of commitment to the plan but the success or failure of the plan.

•A person can be very committed to a plan but unforeseen events may stop the person completing the plan counting it as a failure.

•Continuing is also not rated on commitment as the plan is continuing to happen.

•This can be expressed directly via a committing verb, or indirectly. For example:

•"I *swear* I will stop this" "Swear" is strong committing verb, coded High

•"Nothing is going to stop me this time" This statement has no committing verb, but it indirectly implies commitment and is also coded High

•Separate scales as plans are about going to an action where are goals are about wanting to achieve

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something. These lead to different commitment verbs being used.

Slide 28

Rating High Commitment

- **High Plans**: Statements should indicate that the client is going to complete the plan made. It should indicate that they have strong intentions to change their behaviour.
- Table of High Commitment language on page 2 of coding system
- For example
  - "I will go to the gym once a week"
  - "I am never going into a McDonald's again.
  - "I am definitely going to start eating breakfast"
  - "Its really important to me that I keep going to the gym"
  - "I just got to cut out all chocolate"
- **High Goals**: Statements should indicate that the client is very committed to the goal, wants to achieve it or shows how important the goal is to the client. This can be expressed through the client language or through the client rating on a scale of 1 to 10 how important the goal is. If the client rates the goal as a 6 or higher then is it is rated as high commitment.
- Table of high commitment language on page 3
- Examples
- "I definitely want to lose 1 stone"
- "I want to get to about 13 stone"
- "I really don't want to go back to square one"

Slide 29

Rating Medium/Low commitment

- **Medium/ low Plans**: Statements should indicate that the person may complete the plan however they have not fully pledged to change their behaviour. They may also be wanting to see how things go and haven't fully made up their mind.
- Medium/ Low Commitment Words table on page 2
- Examples
  - "I'll try and avoid carbs and eat more vegetables instead"
  - "I think I will go to the gym next week"
  - "Perhaps I will eat breakfast every day"
- **Medium/Low Goals**: Statements should indicate that the client is not as committed to the goal and is less important to the client. This can be expressed through the client language or through the client rating on a scale of 1 to 10 how important the goal is. If the client rates the goal as 1-5 then is it is rated as high commitment.
- Table of medium/low commitment language on page 3
- Example
  - "I suppose I need to realise that I have lost a lot of weight and I'm looking better"
    - "I think I want to try again to lose the weight I put on at Christmas"
    - " I might want to increase my exercise"

Slide 30

Rating the Degree of Specificity

- Every time, Continuing, Future, Hypothetical plans or Goal Setting are coded a degree of specificity must be assigned: Low or High.

- Past plans are not rated on specificity.

- Degree of specificity implies a clearly defined set of events that precisely identify when and how and possibly where an action will take place.

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•Every time, Continuing, Future, Hypothetical or Goal Setting are coded a degree of specificity must be assigned: Low or High.

•Past plans are not rated on specificity.

•There are separate specificity rating scales for plans are goals are they comprise of different components and does not include a "how".

•Degree of specificity implies a clearly defined set of events that precisely identify when and how and possibly where an action will take place.

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Rating the Degree of Specificity

- **High Plans**: Statements must include "when" a time scale to achieve it in/ the time the plan will occur and "how" they are going to achieve what they want.
- The wording of the "when" should be more specific than "sometime", "at some point" or "in the future" for it to be coded as the "when" of a plan.
- Examples
  - "I always weigh myself everyday"
  - "Every Sunday I plan what I want to eat for the rest of the week"
  - "In the evenings I want to start doing jigsaws"
  - "When I am on holiday I will go for a swim everyday"
- **High Goals**: Statements for rating goals as high must include "when" the goal should be achieved by.
- The wording of the "when" should be more specific than "sometime", "at some point" or "in the future" for it to be coded as the "when" of a plan. If however the client says "this year" or "this summer" etc then that is coded as "when".
- Examples
- "I want to lose 1 stone by my holiday"
- "I want to start going to the gym on Mondays"

•High Plans: Statements must include "when" a time scale to achieve it in/ the time the plan will occur and "how" they are going to achieve what they want.

•"Where" the plan takes place can be included but Not rated as high specificity without the presence of "when".

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•If however the client says "this year" or "this summer" etc then that is coded as "when".

•High Goals: Statements for rating goals as high must include "when" the goal should be achieved by.

•If however the client says "this year" or "this summer" etc then that is coded as "when".

•"Where" the goal takes place can be included but Not rated as high specificity without the presence of "when".

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Rating the Degree of Specificity

- **Low Plans**: Statements must include "how" the client is going to achieve what they want.
- Statements that include the "When", a time scale to achieve it in/ the time the plan will occur, should be rated as high.
- Examples
    "I'm going to look out my old jigsaw puzzles so I can keep busy"
    "I like planning what I eat"
    "When I made curry I always weighted out my rice"
- **Low Goals**: Statements for ratings goals as low will only include the goal that the person wants to achieve.
    Examples
    "I want to lose 3 pounds"
    "I want to go to the gym"
    "I really don't wanna put the weight back on"

•Low plans: Statements must include "how" the client is going to achieve what they want.

•"Where" the plan takes place can be included but not lead to the plan being rated as high specificity.

•Statements that include the "When", a time scale to achieve it in/ the time the plan will occur, should be rated as high.

•Low Goals: Statements for

ratings goals as low will only include the goal that the person wants to achieve.

•"Where" the goal takes place can be included but Not lead to the goal being rated as high specificity.

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Appendix C4-7: Common mistakes made and rules to remember

- When coding a plan/goal think about what it is the client wants to achieve/ what action they want to do. This will help identify and separate plans/goals.

- If the client has made a plan/goal in a previous session as indicated by them or the counsellor then it is coded as a plan/ goal
    - "P: So you said in the last session you were going to start going to the gym, how is that going?

      C: yes its going great I'm really loving the gym"

- If the client has made a plan/goal in a previous session as indicated by them or the counsellor and they report they did not enact the plan/goal it is still coded as a plan/goal.
    - "P: So last week you said that you wanted to lose 2 pounds in a week, how has that gone?

      C: I haven't managed to do it. I just didn't have they time to try"

    - "P: P: So you said in the last session you were going to start going to the gym, how is that going?

      C: I haven't even had time to think about the gym this week"

- Plans/ goals can also be about NOT doing some such as not eating chocolate, not developing diabetes or not putting weight back on.
    - "C: I really don't want to develop diabetes cause of my weight"

    - "C: I really don't want to be 15 stone again"

- If a client talks about something they should do or could do then this is NOT a plan/goal.
    - "C: I know I should be doing more exercise as I know its good for me"

    - "C: My doctor keeps telling me that I need to lose weight and I know I could do it but I'm not sure"

- Two different Plans/ goals can be right next to each other in the text. Remember to look out for these and code both of them.
    - "C: So I am walking every day and I am going to slimming world every week"

    - "C: I want to lose 3 pounds in the next week but by the time I go on holiday I want to have lost half a stone"

Appendix C4-8: Training Examples

P= Practitioner/ therapist
C= Client/ participant
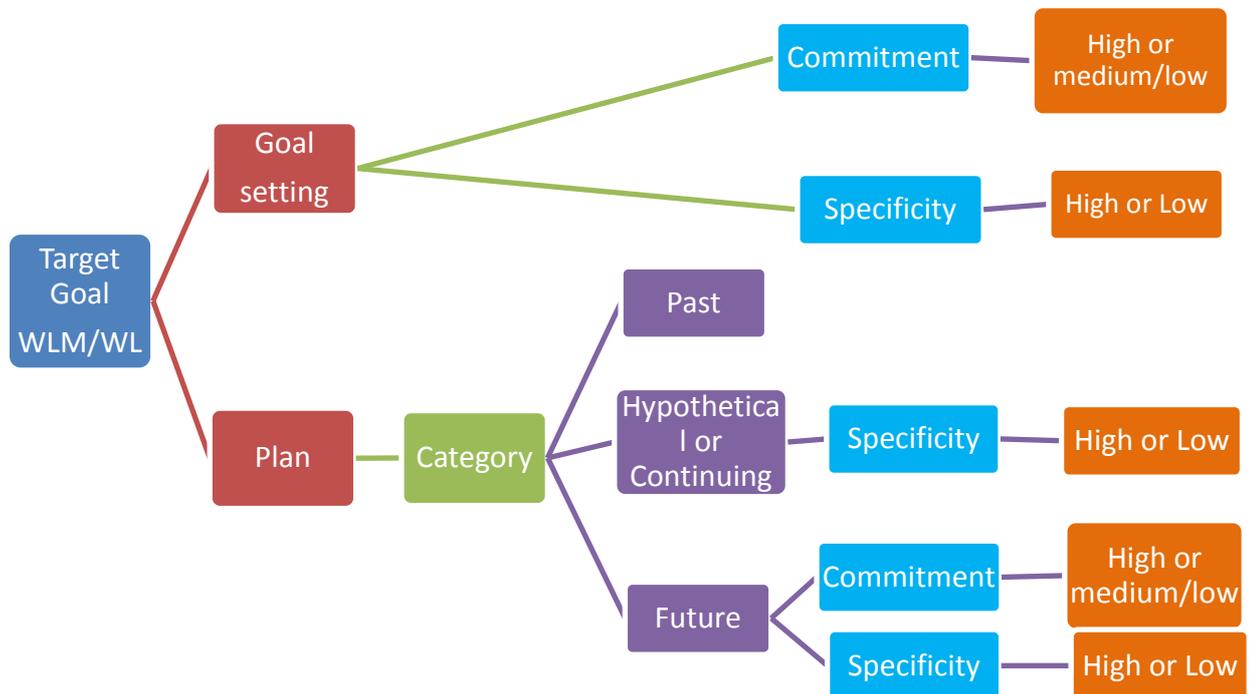
1. P: So what's next over the next sort of few weeks and months for you, then? What's the plan over all?

C: My first focus is getting to fourteen stone nine cos I was sixteen seven last night and fourteen stone nine's this sort of big milestone for me which I want to achieve, cos that was the weight I was when my mother died.

2. P: Are you planning on doing anything different, anything extra, anything …? Changing anything?

C:Well, I'm going to start yoga.

3. C:There was one thing yesterday I noticed that my sister-in-law had been here with her children for a couple of hours and when they um left, I suddenly felt really like starving hungry for junk food. I thought oh that's because, you know, I sort of I used to once guests used to leave, I'd go and eat something automatically. It lasted, you know, for a good half an hour this feeling that, you know, they've gone and I'm on my own, I could eat something but um I didn't, I waited and waited and did other things and then it went away and I thought "Oooh".

4. P: So how are things going with slimming world?

C: Its going really well. The leader is great and she is really supportive. I go every week and stay for the whole thing.

5. C: I'm really struggling in the evening at the moment. I keep snacking on things and I know it's not good for me. I know I should stop but I'm just not sure how to.

P: It sounds like you have identified a really issue for you there, I am wondering if you can think of any ideas about what you might do to keep yourself busy?
C: If I went to a class in the evening then that would mean I was busy.

Appendix C4-9: Transcript for reliability testing

Please read through the transcript and code where you see a plan or a goal. You do **not** have to identify the category of plan or code it for commitment or specificity.

P= Practitioner/therapist
C= Client/ participant

Study Name: WILMA
Participant ID Number: 060312
MI Session Date: 06/03/12
Session Number: S2(1)
MI Session length: 00:59:27
Transcript length: 31 Pages

1. P: You also were saying here that in your goals that you were going to send your weekly weight to the WILMA team.
2. C: I do mean to do that, yeah. I'll do that tonight.
3. P: Ok. Let me put that down.
4. C: Yeah, I think I had the log in a week ago.
5. P: Ok then. And you're then to try and start the diet exercise monitoring sheet.
6. C: I haven't done that either.
7. P: OK.
8. C: ((laughter)).
9. P: It's in the stuff that you've got to do by the sounds of it. You were going to try and do that at work, so I wonder if that's a part of what's happened there because you've had such a huge change at work.
10. C: Yeah, I think that that we've had seven, effectively six weeks of not doing anything and now I guess we're making up for it so, it was…
11. P: hmm it was full on
12. C: It's gone back to how it was but a little bit more chaotic because before I used to be in charge of my own kind of things that I needed to do at work whereas now it's now as and when and other people are obviously dictating what needs to be done and when so they have as much control of my work in day to day life. Which is fine. And I know that will calm down um eventually.
13. P: How about your exercise? Are you still doing the walks?
14. C: Yeah, I'm still walking…
15. P: to work?
16. C: Yes and that's day to day.
17. P: Yes.
18. C: It's a traditional activity I think.
19. P: So in terms of your goals then you've been doing some of the stuff that you wanted to do like keeping going to Slimming World,
20. C: yeah.
21. P: And still doing your walking and you had a go at not weighing but still in the sense that, I mean, it all things we agreed really to do with how to cope with work being so stressful because you were so bored but all that has changed, hasn't it?
22. C: Yeah.
23. P: How's the diet plan gone from Slimming World?

24. C: Yes, I we planned it out. I'd seen you, I think, on the Tuesday with, actually my partner was really good on the Thursday, he pretty much, I think he had the day off, so he planned out what we were going to eat in the week and he was, he was actually better at keeping me on track sometimes than I am myself. We went to the supermarket we had a plan but then I think because we went to again so late at night so lo and behold loads and loads of things that were reduced that you don't really need but you end up buying anyway.
25. P: So planning wise it's gone back to how it was last year, is that right?
26. C: Right
27. P: And how have you found that?
28. C: Yeah, it's does make a big difference. Again, you're not buying a load of food in that you don't need.
29. P: So those impulse buys have reduced and then you plan what you're going to have?
30. C: Yeah. And it does make it easier then for the both of us in terms of whoever's cooking.
31. P: Yeah.
32. C: You pretty much know, actually what we are going to have.
33. P: So the two of you plan together, do you and work out the meals?
34. C: (Name of partner) plans one week and I'll plan together and then whoever's home will know so I'm really lucky in that respect that it's obviously not everybody's partner who's so supportive ((laughs)) No, he is really supportive I think and also he enjoys cooking.
35. P: Hmm so that's fantastic so that's helped with your weight?
36. C: Yeah, definitely
37. P: But there's this blip from the shopping trip
38. C: Yeah
39. P: Were there other times in the week that you found hard as well?
40. C: There was an impromptu trip round to a friend's house and I guess again it goes back to control
41. P: Why?
42. C: Well because I don't have to eat but I ate what they were eating. Again, you get the snacks appearing because, you know, you're helping yourself, picking a bit. But I guess I can't dictate to them what to cook.
43. P: Will you go around
44. C: only to watch the rugby so there's obviously a bit of drink involved and nibbles and then we stayed later than originally planned, making tea there. So I think on a normal day I probably wouldn't eat as badly, again it wasn't terrific because I don't eat meat but it just wasn't what I'd planned to eat.
45. P: Right. So sometimes life takes over
46. C: Yeah
47. P: We go off piste because you're enjoying yourself and socialising
48. C: Yeah
49. P: But it sounds like when that happens, you, you know, that happens but then you get back on track afterwards.
50. C: Yeah. I guess I've just not been a hundred per cent on track. I probably have been like eighty per cent on track the meals are pretty good. It's just then in between you're picking. So at the moment I'm continuing to try to cut out the picking at food cos I know then that I'm actually going over my allowance of calories.
51. P: Right.

52. C: I think I do feel happy how I am now, maintaining. But I do want to then at the same time shift this half a stone
53. P: Right
54. C: So I don't know at the moment how much I want it, what's more important to me.
55. P: Right. So on the one hand it's quite important to lose the half stone, on the other hand…
56. C: I'm quite happy how I am.
57. P: Quite happy how you are, quite enjoying a bit of freedom
58. C: Yeah.
59. P: and eating a few varieties of things that you've missed
60. C: Yeah.
61. P: It's quite a dilemma for you, do you think?
62. C: Yeah. I guess it is because I know I've not got to the target that I set so I want to get to that to say I've done it and now
63. P: Hmmm
64. C: I can maintain…
65. P: Would it be helpful if you have a little think about that dilemma and the pros and cons of…
66. C: Yeah that's good.
67. P: Ok. So if you can think about staying the same weight as you are and sticking now. What would be good about that for you?
68. C: Uuuuh
69. P: What would help you?
70. C: Uuuuh I guess a practicality then to fit into all my clothes and I wouldn't have to be buy anything new, everything fits well. Also in a way I guess I know then I can have more calories, effectively.

Appendix C4-10: Example sentences of plans and goals for reliability testing

Below is a list of 15 goals, plans and some statements that are neither plans or goals. Please code each example according to the planning talk coding system.
In the examples:
P= Practitioner/therapist
       C= Client/ participant
The types of ways people can maintain or lose weight are:

- Diet- cutting out foods, weighing foods, using low fat sprays or portion control, eating breakfast, not having bad food in the house or planning what they are going to have for every meal and only buy they food they need from the shops.
- Exercise- gym, walking or lifting cans of beans
- Self-monitoring- weighing themselves on a regular basis. This can include weighing themselves and sending it into the WILMA study.
- Increasing confidence in themselves/ changing perceptions of themselves e.g. realising they are thin.
- Distracting themselves from snacking with other activities or removing themselves from temptation.
- Recognising when they are hungry and when they are eating because they are bored.
- If the client has a bad day the plan could be to start fresh the next day with the diet rather than give up altogether.

     Examples

1)

This is a discussion about ideas that the client can do to stop snacking in the evenings.

C: I know I'll be fine through the day, it's the, it's the nights.

P: So maybe there's something about keeping active in in at that time by spending some time socialising and you've also said that maybe another way of sort of filling that time is to get the knitting needles out.

C: To get the knitting needles out, yeah.

P: What are your thoughts on that?

C: Yeah, I know, I'll look for them and I know the knitting will help cos I think, cos I'm using my hands, you see which will keep me busy

2)

In this they are talking about things that the client did last week to increase her blood sugars in a health way which would keep her on track with her diet.

C: Hmm cos I did last week I ate some grapes instead because grapes are very high, so I had quite a few of those instead of having the chocolate.

P: Hmmm And did that work?

C: Yes, that wasn't too bad.

3)

In this section the client is talking about the idea of self-monitoring her weight

P: I think it's really helpful to talk about (self-monitoring) and if you're happy to keep talking about it…

C: Yeah, that's fine. I always weigh myself every day…

4)

In this section the client is talking about the effects of being stressed at work on her weight.

C: I've been really stressed at work recently which is starting to make me comfort eat again. It's getting me really down cause I know I shouldn't do it but I just can't stop.

P: It sounds like a really difficult time for you at the moment.

C: Yeah it is and I just don't really know what I can do to change.

5)

This client is talking about planning out what they are going to eat.

C: So we plan out what we were going to eat.

P: And and how have you found that?

C: yeah, it's does make a big difference as you're not buying a load of food in.

6)

This client is talking about planning out what they are going to eat.

C: I guess, again, where I've done, continued with the planning of what we're going to buy and what meals we're going to eat. We do this every Sunday so we know what we are going to have for the rest of the week.

7)

In this Section the client is talking about getting down to a particular weight.

P: Have you got a number in your mind that you're just not articulating to anybody?

C: I want to get to about twelve stone six, I would.

P: So you'd want to be doing the up and down bit around the half a stone rather than the stone.

C: Yeah. Yes, I don't want to be thirteen stone.

P: No.

C: Yeah. I want to be twelve stone six.

8)

The client is talking about wanting to reach a more confident state of mind.

P: So you've got fantastic support. Thinking about the future, what for you would be next in terms of boosting your confidence in yourself, now?

C: Yeah. I suppose it's just for me to realise that I do look better. That I am looking thin instead of me stuffing and still fat, like. I think it just made that little bit more then.

9)

The quote is about the client discussing their reaction to a consolation with their GP.

C: So my GP said I really need to lose some weight as If I don't I could end up with diabetes. This got me really worried and thinking about my weight.

P: Sounds like that was quite a shock for you.

C: Yeah it was a total shock. I didn't realise my weight was that bad and I really don't wanna end up with diabetes.

10)

This is a discussion about ideas that the client can do to stop snacking in the evenings.

C: One idea would be if I can get it (Laptop) off him for an hour or two in the night and chat away, then I know I won't be out looking in a cupboard.

P: So there's something about keeping active in in at that time...?

C: Yeah.

P: And one idea of a way that you can keep active is to get hold of the laptop one way or another from your son...

C: Yeah, yeah.

11)

This is talking about self-monitoring.

P: What do you think you're going to do with weighing?

C: Uuum. I'm just not sure cause I know it's supposed to be good for me but I know it would really get me down and stressed.

12)

This client is talking about possible diet ideas during her holiday.

P: Yes, ok so right, so you're hoping you can keep up your healthy eating when you're in Italy.

C: Yes, yes.

P: Hmmm

C: Um and try and avoid those pasta well it's going to be difficult but I'm not going to be I'm not going to be so fussy about that but I'll try to keep on the salad rather than the pasta

13)

This client is talking about eating pasta and making a smaller portion.

C: Whenever I'm having a pasta dish, I just consciously make a smaller portion of it cos I know with Slimming World it's all free and you can have it all and that's fine"

14)

This Section is talking about an idea that the client had in the previous counselling session.

P: And you were going to keep on trying to lose this half stone.

C: I haven't been able to achieve it yet but I think I want to try again to lose it.

15)

In this Section the practitioner is asking the client how important it is that the client maintains the weight that she is at.

P: Oh. So if you were to give a score out of ten for now for how important it is that you hold on to this weight loss, how important out of ten would you say it is for you to keep it as it is?

C: Oh, it's really… I'd say ten out of ten.

P: Right.

C: I really don't want to put it back on.

P: Hmm

C: Yes, cos I…

P: So, this really

C: Is important, yes…

P: Because it's…

C: Well, I feel better since I've lost the weight… umm

Appendix C6-1: Results Tables- : Univariate, logistic and multiple regression

Table 1: Univariate and Multiple regression analysis for total plans, types of plans and BMI outcome

Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics and motivation	Adjusted Total plans coefficient	SE	p-value	Lower bound	Upper bound
Total plans	-0.1	0.1	0.140	-0.2	0.0
Total goals	0.2	0.2	0.267	-0.2	0.6
Multiple regression				95% C.I	
Covariates adjusted for	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total plans and BMI	-0.1	0.1	0.056	-0.2	0.0
Total goals and BMI	0.3	0.2	0.089	-0.1	0.9

Table 2: Univariate and Multiple regression analysis for total plans, types of plans and Weight outcome

Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics and motivation	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total plans	-0.3	0.1	0.041	-0.5	0.0
Total goals	0.5	0.6	0.408	-0.7	1.6
Multiple regression				95% C.I	
Covariates adjusted for	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total plans	-0.3	0.1	0.018	-0.6	0.0
Total goals	0.8	0.5	0.143	-0.3	2.0

Table 3: Univariate and Multiple regression analysis for total plans, types of plans and maintaining a weight loss outcome

Univariate adjustment					95% C.I	
Covariates adjusted for individual patient characteristics and motivation	Adjusted Total plans coefficient	SE	p-value	Odds ratio	Lower bound	Upper bound
Total plans	-1.1	0.1	0.079	0.9	0.8	1.0

Total goals	-0.4	0.2	0.107	0.7	0.4	1.1
Multiple regression					95% C.I	
Covariates adjusted for	Adjusted coefficient	SE	p-value	Odds ratio	Lower bound	Upper bound
Total plans	-0.1	0.1	0.132	0.9	0.8	1.0
Total goals	-0.3	0.2	0.195	0.7	0.5	1.2

Table 4: Univariate and Multiple regression analysis for total plans, types of plans and BMI outcome

Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted Total plans coefficient	SE	p-value	Lower bound	Upper bound
Total plans	-0.1	0.1	0.266	-0.2	0.1
Future plans	-0.1	0.1	0.727	-0.3	0.2
Continuing plans	-0.1	0.1	0.559	-0.3	0.2
Past plans	0.0	0.1	0.988	-0.3	0.3
Hypothetical plans	0.3	0.3	0.409	-0.4	1.0
Total goals	0.3	0.2	0.114	-0.1	0.8
Multiple regression				95% C.I	
Covariates adjusted for	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total plans and BMI	-0.1	0.1	0.094	-0.2	0.0
Total goals and BMI	0.5	0.2	0.045	0.0	0.9

Table 5: Univariate and Multiple regression analysis for total plans, types of plans and Weight outcome

Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total plans	-0.2	0.1	0.103	-0.5	0.1
Future plans	-0.2	0.4	0.633	-1.0	0.6
Continuing plans	-0.2	0.3	0.580	-0.7	0.4
Past plans	-0.1	0.4	0.831	-0.8	0.7

Hypothetical plans	0.7	0.9	0.403	-1.1	2.5
Total goals	0.8	0.6	0.169	-0.4	2.0
Multiple regression				95% C.I	
Covariates adjusted for	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total plans	-0.3	0.1	0.031	-0.6	0.0
Total goals	1.1	0.6	0.059	0.0	2.3

Table 6: Univariate and Multiple regression analysis for total plans, types of plans and maintaining a weight loss outcome

Univariate adjustment					95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted Total plans coefficient	SE	p-value	Odds ratio	Lower bound	Upper bound
Total plans	-1.1	0.1	0.074	0.9	0.8	1.0
Future plans	0.1	0.1	0.457	1.1	0.8	1.5
Continuing plans,	-0.1	0.1	0.163	0.9	0.7	1.1
Past plans	-0.1	0.1	0.393	0.9	0.7	1.2
Hypothetical plan	-0.4	0.4	0.299	0.7	0.3	1.4
Total goals	-0.4	0.2	0.122	0.7	0.4	1.1
Multiple regression					95% C.I	
Covariates adjusted for	Adjusted coefficient	SE	p-value	Odds ratio	Lower bound	Upper bound
Total plans	-0.1	0.1	0.122	0.9	0.8	1.0
Total goals	-0.3	0.2	0.2	0.7	0.5	1.2

Table 7: Univariate and Multiple regression analysis for commitment, specificity and Weight outcome

Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total high commitment plans	0.0	0.6	0.991	-1.3	1.2
Total low commitment plans	-0.5	0.6	0.421	-1.8	0.8
Total high specificity plans	-0.2	0.2	0.385	-0.7	0.3

Total low specificity plans	0.3	0.4	0.521	-0.6	1.1
Total high commitment goals	1.4	0.8	0.101	-0.3	3.0
Total low commitment goals	0.7	1.2	0.661	-1.8	3.2
Total high specificity goals	0.9	1.1	0.407	-1.3	3.0
Total low specificity goals	1.3	0.9	0.153	-0.5	3.1
Multiple regression				95% CI	
	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total high commitment plans	-0.3	0.7	0.702	-1.7	1.2
Total low commitment plans	-0.6	0.7	0.418	-2.1	1.0
Total high specificity plans	0.7	0.5	0.161	-0.3	1.7
Total low specificity plans	1.0	0.6	0.081	-0.1	2.1
Total high commitment goals	1.3	23.9	0.958	-47.6	50.1
Total low commitment goals	3.1	24.0	0.898	-46.0	52.3
Total high specificity goals	-0.4	24.0	0.986	-49.6	48.7
Total low specificity goals	0.7	24.3	0.979	-49.0	50.3

Table 8: Univariate and Multiple regression analysis for commitment, specificity and BMI outcome

Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total high commitment plans	0.1	0.2	0.585	-0.3	0.6
Total low commitment plans	-0.3	0.2	0.263	-0.7	0.2
Total high specificity plans	-0.1	0.1	0.425	-0.3	0.1
Total low specificity plans	0.1	0.2	0.496	-0.2	0.4
Total high commitment goals	0.5	0.3	0.093	-0.1	1.1
Total low commitment goals	0.5	0.4	0.268	-0.4	1.4

	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total high specificity goals	0.4	0.4	0.364	-0.4	1.2
Total low specificity goals	0.6	0.3	0.061	-0.0	1.3
Multiple regression				95% CI	
	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Total high commitment plans	0.1	0.3	0.740	-0.4	0.6
Total low commitment plans	-0.4	0.3	0.215	-0.9	0.2
Total high specificity plans	0.2	0.2	0.389	-0.2	0.6
Total low specificity plans	0.3	0.2	0.174	-0.1	0.7
Total high commitment goals	-0.1	3.7	0.977	-7.6	7.4
Total low commitment goals	-0.1	3.7	0.983	-7.7	7.5
Total high specificity goals	0.3	3.7	0.942	-7.3	7.9
Total low specificity goals	0.8	3.7	0.823	-6.8	8.5

Table 9: Univariate and Multiple regression analysis for commitment, specificity and Maintaining a weight loss outcome

Univariate adjustment					95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Odds ratio	Lower bound	Upper bound
Total high commitment plans	0.0	0.2	0.944	1.0	0.7	1.5
Total low commitment plans	0.3	0.2	0.242	1.3	0.8	2.0
Total high specificity plans	-0.1	0.1	0.398	0.9	0.8	1.1
Total low specificity plans	-0.1	0.2	0.450	0.9	0.7	1.2
Total high commitment goals	-0.4	0.3	0.196	0.7	0.3	1.3
Total low commitment goals	-0.4	0.4	0.324	0.7	0.3	1.5
Total high specificity goals	0.1	0.4	0.820	1.1	0.5	2.2

					95% C.I	
Total low specificity goals	-0.9	0.4	0.019	0.4	0.8	0.9
Multiple regression					95% C.I	
Covariates adjusted for	Adjusted coefficient	SE	p-value	Odds ratio	Lower bound	Upper bound
Total plans	-0.1	0.1	0.122	0.9	0.8	1.0
Total goals	-0.3	0.2	0.231	0.8	0.5	1.2
High commitment plans	0.0	0.3	0.903	1.0	0.6	1.7
Low commitment plans	0.5	0.3	0.092	1.7	0.9	3.1
High specificity plans	0.1	0.2	0.720	1.1	0.7	1.5
Low specificity plans	-0.2	0.1	0.106	0.8	0.6	1.0
High commitment goals	42.425	56839.599	0.999	2.659E+18	0.000	.
Low commitment goals	43.616	56839.599	0.999	8.750E+18	0.000	.
High specificity goals	-42.134	56839.599	0.999	0.000	0.000	.
Low specificity goals	-44.330	56839.599	0.999	0.000	0.000	.

Appendix C6-2: Results Tables: Categorisation variables: Univariate, logistic and multiple regression

Categorisation variables and weight outcomes

Table 10: Univariate and Multiple regression analysis for plans and goals and BMI outcome

BMI					
Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics and motivation	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Low plans	Reference category				
High plans	-1.2	1.0	0.219	-3.2	0.7
Medium plans	-1.0	1.2	0.415	-3.2	1.3
No goals	Reference category				
High goals	0.7	0.8	0.373	-0.9	2.2
Medium goals	3.5	1.0	0.002	1.4	5.6
Mulitvariate adjustment					
Low plans	Reference category				
High plans	-1.1	0.8	0.149	-2.7	0.4
Medium plans	-0.7	1.1	0.491	-2.7	1.3
No goals	Reference category				
Medium Goals	3.6	1.0	0.001	1.5	5.7
High Goals	1.0	0.8	0216	-0.6	2.6

Table 11: Univariate and Multiple regression analysis for plans and goals and weight outcome

Weight					
Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics and motivation	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Low plans	Reference category				
High plans	-2.8	2.5	0.273	-8.0	2.3
Medium plans	-2.0	3.3	0.544	-8.7	4.7
No goals	Reference category				
Medium Goals	8.8	2.9	0.006	2.7	15.0
High Goals	1.1	2.2	0.624	-3.4	5.6
Multivariate adjustment					
Low plans	Reference category				
High plans	-3.9	2.3	0.102	-8.6	0.8
Medium plans	1.7	2.9	0.563	-7.7	4.3

No goals	Reference category				
Medium Goals	9.5	3.0	0.003	3.4	15.6
High Goals	2.0	2.2	0.370	-2.5	6.6

Table 12: Univariate and Multiple regression analysis for plans and goals and maintaining a weight loss outcome

Maintaining a weight loss						
Univariate adjustment					95% C.I	
Covariates adjusted for individual patient characteristics and motivation	Adjusted coefficient	SE	p-value	Odds ratio	Lower bound	Upper bound
Low plans	Reference category					
High plans	-1.9	1.3	0.152	0.2	0.0	2.0
Medium plans	-0.4	1.6	0.816	0.7	0.0	15.1
No goals	Reference category					
Medium Goals	-3.5	1.6	0.034	0.0	0.0	0.8
High Goals	-3.1	1.5	0.042	0.0	0.0	0.9
Multivariate adjustment						
Low plans	Reference category					
High plans	-2.0	1.4	0.137	0.1	0.0	2.0
Medium plans	-1.4	1.7	0.424	0.3	0.0	7.3
No goals	Reference category					
Medium Goals	-3.1	1.6	0.044	0.0	0.0	1.0
High Goals	-3.5	1.6	0.032	0.0	0.0	0.7

Table 13: Univariate and Multiple regression analysis for plans and goals and BMI outcome

BMI					
Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Low plans	Reference category				
High plans	-0.9	0.9	0.373	-2.8	1.1
Medium plans	0.3	1.2	0.783	-2.1	2.8
No goals	Reference category				
High goals	1.2	0.9	0.192	-0.6	2.9
Medium goals	3.6	1.2	0.005	1.1	6.0
Multivariate adjustment					

Low plans	Reference category				
High plans	-1.4	0.9	0.133	-3.1	0.4
Medium plans	0.5	1.1	0.640	-1.7	2.7
No goals	Reference category				
Medium Goals	3.8	1.2	0.003	1.4	6.2
High Goals	1.5	0.9	0.098	-0.3	3.3

Table 14: Univariate and Multiple regression analysis for plans and goals and weight outcome

Weight					
Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Low plans	Reference category				
High plans	-3.2	2.7	0.251	-8.7	2.4
Medium plans	1.4	3.3	0.665	-5.3	8.1
No goals	Reference category				
Medium Goals	8.9	3.3	0.012	2.2	15.7
High Goals	2.4	2.4	0.313	-2.4	7.3
Multivariate adjustment					
Low plans	Reference category				
High plans	-4.6	2.5	0.080	-9.7	0.6
Medium plans	1.5	2.9	0.619	-4.6	7.5
No goals	Reference category				
Medium Goals	9.8	3.3	0.006	3.1	16.5
High Goals	3.4	2.4	0.168	-1.5	8.3

Table 15: Univariate and Multiple regression analysis for plans and goals and maintaining a weight loss outcome

Maintaining a weight loss						
Univariate adjustment					95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Odds ratio	Lower bound	Upper bound
Low plans	Reference category					
High plans	-1.9	1.3	0.143	0.2	0.0	1.9
Medium plans	-0.3	1.2	0.785	0.7	0.1	8.0
No goals	Reference category					
Medium Goals	-3.5	1.6	0.034	0.0	0.0	0.8
High Goals	-3.1	1.5	0.042	0.0	0.0	0.9

Multivariate adjustment						
Low plans	Reference category					
High plans	-1.9	1.3	0.149	0.2	0.0	2.0
Medium plans	-0.8	1.4	0.576	0.5	0.0	6.7
No goals	Reference category					
Medium Goals	-3.3	1.7	0.053	0.0	0.0	1.1
High Goals	-3.2	1.7	0.056	0.0	0.0	1.1

Table 16: Univariate and Multiple regression analysis for types of plans and weight outcome

Weight						
Univariate adjustment				95% C.I		
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound	
Low Future plans	Reference category					
High Future plans	0.2	2.5	0.944	-4.9	5.3	
Medium Future plans	-4.0	3.8	0.298	-11.8	3.7	
Low Continuing plans	Reference category					
High Continuing plans	-2.9	2.6	0.280	-8.2	2.3	
Medium Continuing plans	4.6	3.0	0.139	-1.6	10.7	
No hypothetical plans	Reference category					
High hypothetical plans	2.8	3.5	0.435	-4.4	9.9	
Medium hypothetical plans	-0.2	3.1	0.947	-6.4	6.0	
Low past plans	Reference category					
High past plans	-0.7	2.6	0.801	-6.0	4.7	
Medium past plans	2.1	3.4	0.533	-4.8	9.1	

Table 17: Univariate and Multiple regression analysis for types of plans and BMI outcome

BMI						
Univariate adjustment				95% C.I		
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound	
Low Future plans	Reference category					
High Future plans	0.1	0.9	0.902	-1.7	1.9	
Medium Future plans	-1.7	1.379	0.231	-4.5	1.1	
Low Continuing plans	Reference category					
High Continuing plans	-0.8	0.9	0.372	-2.7	1.1	

Medium Continuing plans	1.6	1.1	0.148	-0.6	3.8
No hypothetical plans	Reference category				
High hypothetical plans	1.0	1.3	0.439	-1.6	3.6
Medium hypothetical plans	0.7	1.1	0.950	-2.1	2.3
Low past plans	Reference category				
High past plans	0.1	0.9	0.954	-1.8	1.9
Medium past plans	0.8	1.2	0.508	-1.6	3.2

Table 18: Univariate and Multiple regression analysis for types of plans and maintaining a weight loss outcome

Maintaining a weight loss						
Univariate adjustment					95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Odd ratio	Lower bound	Upper bound
Low Future plans	Reference category					
High Future plans	1.0	1.2	0.404	2.8	0.3	31.9
Medium Future plans	0.71	1.4	0.597	2.1	0.1	29.1
Low Continuing plans	Reference category					
High Continuing plans	-0.6	1.0	0.583	0.6	0.1	4.2
Medium Continuing plans	-0.5	1.1	0.612	0.6	0.1	4.6
No hypothetical plans	Reference category					
High hypothetical plans	-0.3	1.1	0.788	0.7	0.1	5.9
Medium hypothetical plans	-0.2	1.0	0.829	0.8	0.1	5.8
Low past plans	Reference category					
High past plans	0.9	1.1	0.164	0.4	0.3	20.6
Medium past plans	1.7	1.2	0.164	5.7	0.5	65.2

Commitment, specificity plans and weight outcomes

Table 19: Univariate and Multiple regression analysis for commitment, specificity plans and BMI outcome

BMI					
Univariate adjustment				95% C.I	
Covariates adjusted for individual patient	Adjusted coefficient	SE	p-value	Lower bound	Upper bound

characteristics					
Low number of high commitment plans	Reference category				
Medium number of high commitment plans	-1.5	1.5	0.329	-4.5	1.5
High number of high commitment plans	0.0	1.1	0.996	-2.2	2.2
Low number of low commitment plans	Reference category				
Medium number of low commitment plans	-0.3	1.2	0.808	-2.7	2.1
High number of low commitment plans	-1.3	1.0	0.193	-3.3	0.7
High number of high specificity plans	Reference category				
Medium number of high specificity plans	-0.5	1.1	0.666	-2.7	1.8
High number of high specificity plans	-0.1	1.0	0.935	-2.1	1.9
Low number of low specificity plans	Reference category				
Medium number of low specificity plans	-0.3	1.0	0.801	-2.3	1.8
High number of low specificity plans	0.9	1.0	0.367	-1.1	2.8
Multivariate adjustment					
Low number of high commitment plans	Reference category				
Medium number of high commitment plans	-1.7	1.7	0.327	-5.3	1.8
High number of high commitment plans	0.0	1.3	0.976	-2.3	2.4
Low number of low commitment plans	Reference category				
Medium number of low commitment plans	-0.5	1.4	0.722	-3.4	2.4
High number of low commitment plans	-0.9	1.2	0.485	-3.3	1.6
High number of high specificity plans	Reference category				
Medium number of high specificity plans	-0.3	1.3	0.794	-3.0	2.3
High number of high specificity plans	1.8	1.6	0.273	-1.5	5.0

Low number of low specificity plans	Reference category				
Medium number of low specificity plans	-0.3	1.2	0.799	-2.7	2.1
High number of low specificity plans	1.3	1.1	0.247	-1.0	3.5

Table 20: Univariate and Multiple regression analysis for commitment, specificity plans and weight outcome

Weight					
Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Low number of high commitment plans	Reference category				
Medium number of high commitment plans	-3.7	4.1	0.376	-12.2	4.7
High number of high commitment plans	-1.2	3.0	0.684	-7.4	4.9
Low number of low commitment plans	Reference category				
Medium number of low commitment plans	0.8	3.4	0.821	-6.2	7.8
High number of low commitment plans	-2.2	2.8	0.443	-8.0	3.6
High number of high specificity plans	Reference category				
Medium number of high specificity plans	-1.0	3.2	0.766	-7.5	5.6
High number of high specificity plans	-0.4	2.7	0.885	-5.9	5.1
Low number of low specificity plans	Reference category				
Medium number of low specificity plans	0.2	2.8	0.933	-5.3	5.8
High number of low specificity plans	2.6	2.6	0.323	-2.7	8.0
Multivariate adjustment					
Low number of high commitment plans	Reference category				
Medium number of high commitment plans	-4.2	5.0	0.408	-14.5	6.1
High number of high commitment plans	-1.3	3.3	0.685	-8.1	5.5

Low number of low commitment plans	Reference category				
Medium number of low commitment plans	0.4	4.2	0.927	-8.4	9.1
High number of low commitment plans	-1.2	3.4	0.726	-8.3	5.8
Low number of high specificity plans	Reference category				
Medium number of high specificity plans	0.4	3.8	0.911	-7.4	8.2
High number of high specificity plans	5.8	4.3	0.186	-3.0	14.7
Low number of low specificity plans	Reference category				
Medium number of low specificity plans	-0.2	3.2	0.955	-6.9	6.5
High number of low specificity plans	4.6	3.1	0.164	-2.0	11.2

Table 21: Univariate and Multiple regression analysis for commitment, specificity plans and maintaining a weight loss outcome

Maintaining a weight loss						
Univariate adjustment					95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Odd ratio	Lower bound	Upper bound
Low number of high commitment plans	Reference category					
Medium number of high commitment plans	0.6	1.3	0.646	1.8	0.1	23.2
High number of high commitment plans	1.0	1.4	0.492	2.6	0.2	38.8
Low number of low commitment plans	Reference category					
Medium number of low commitment plans	0.8	1.2	0.479	2.3	0.2	25.1
High number of low commitment plans	1.4	1.4	0.315	4.0	0.3	58.9
Low number of high specificity plans	Reference category					
Medium number of high specificity plans	3.9	1.7	0.017	51.5	2.0	1327.0
High number of high specificity plans	0.9	1.2	0.471	2.3	0.2	23.2

Low number of low specificity plans	Reference category					
Medium number of low specificity plans	-0.3	1.0	0.747	0.7	0.1	4.8
High number of low specificity plans	-1.9	1.2	0.121	0.2	0.0	1.7
Multivariate adjustment						
Low number of high commitment plans	Reference category					
Medium number of high commitment plans	-0.1	2.0	0.149	0.9	0.0	49.9
High number of high commitment plans	0.9	1.9	0.636	2.5	0.1	110.6
Low number of low commitment plans	Reference category					
Medium number of low commitment plans	0.9	2.0	0.663	2.4	0.1	127.7
High number of low commitment plans	1.3	2.3	0.561	3.8	0.0	346.0
Low number of high specificity plans	Reference category					
Medium number of high specificity plans	3.8	2.0	0.052	46.3	1.0	2218.4
High number of high specificity plans	1.7	2.5	0.508	5.3	0.0	732.9
Low number of low specificity plans	Reference category					
Medium number of low specificity plans	-0.8	1.5	0.596	0.5	0.0	8.4
High number of low specificity plans	-3.1	2.2	0.151	0.0	0.0	3.1

Table 22: Univariate and Multiple regression analysis for commitment, specificity goals and BMI outcome

BMI					
Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Low number of high commitment goals	Reference category				
Medium number of high commitment goals	1.6	1.0	0.142	-0.6	3.7
High number of high commitment goals	1.7	0.8	0.042	0.1	3.4

Low number of low commitment goals	Reference category				
Medium number of low commitment goals	1.0	1.2	0.3	-0.8	2.9
High number of low commitment goals	1.698	1.074	0.123	-0.487	3.883
High number of high specificity goals	Reference category				
Medium number of high specificity goals	1.9	1.1	0.085	-0.3	4.1
High number of high specificity goals	0.5	1.0	0.628	-1.5	2.4
Low number of low specificity goals	Reference category				
Medium number of low specificity goals	2.5	1.1	0.028	0.3	4.7
High number of low specificity goals	1.6	0.7	0.034	0.1	3.2
Multivariate adjustment					
Low number of high commitment goals	Reference category				
Medium number of high commitment goals	0.6	1.6	0.712	-2.7	3.8
High number of high commitment goals	2.0	1.7	0.251	-1.5	5.5
Low number of low commitment goals	Reference category				
Medium number of low commitment goals	2.0	1.5	0.208	-1.2	5.1
High number of low commitment goals	0.9	1.4	0.545	-2.1	3.8
High number of high specificity goals	Reference category				
Medium number of high specificity goals	0.6	1.4	0.655	-2.3	3.6
High number of high specificity goals	-1.8	1.5	0.227	-4.9	1.2
Low number of low specificity goals	Reference category				
Medium number of low specificity goals	0.9	1.7	0.593	-2.6	4.5
High number of low specificity goals	0.4	1.6	0.818	-2.9	3.6

Table 23: Univariate and Multiple regression analysis for commitment, specificity goals and weight outcome

Weight					
Univariate adjustment				95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Lower bound	Upper bound
Low number of high commitment goals	Reference category				
Medium number of high commitment goals	3.4	2.9	0.256	-2.6	9.4
High number of high commitment goals	5.5	2.2	0.021	0.9	10.0
Low number of low commitment goals	Reference category				
Medium number of low commitment goals	1.6	2.7	0.560	-4.0	7.2
High number of low commitment goals	3.7	3.2	0.258	-2.9	10.3
High number of high specificity goals	Reference category				
Medium number of high specificity goals	7.0	3.0	0.027	0.9	13.2
High number of high specificity goals	0.3	2.5	0.990	-5.2	5.2
Low number of low specificity goals	Reference category				
Medium number of low specificity goals	5.8	3.0	0.059	-0.2	11.8
High number of low specificity goals	3.9	2.1	0.073	-0.4	8.2
Multivariate adjustment					
Low number of high commitment goals	Reference category				
Medium number of high commitment goals	0.1	4.7	0.990	-9.7	9.9
High number of high commitment goals	6.2	4.7	0.198	-3.5	16.0
Low number of low commitment goals	Reference category				
Medium number of low commitment goals	3.5	4.3	0.418	-5.3	12.3
High number of low commitment goals	1.1	4.0	0.792	-7.2	9.4

Low number of high specificity goals	Reference category				
Medium number of high specificity goals	4.6	4.1	0.280	-4.0	13.1
High number of high specificity goals	-6.7	4.0	0.109	-14.9	1.6
Low number of low specificity goals	Reference category				
Medium number of low specificity goals	1.9	4.6	0.678	-7.6	11.4
High number of low specificity goals	1.7	4.2	0.684	-7.0	10.5

Table 24: Univariate and Multiple regression analysis for commitment, specificity goals and maintaining a weight loss outcome

Maintaining a weight loss						
Univariate adjustment					95% C.I	
Covariates adjusted for individual patient characteristics	Adjusted coefficient	SE	p-value	Odd ratio	Lower bound	Upper bound
Low number of high commitment goals	Reference category					
Medium number of high commitment goals	-3.3	1.4	0.014	0.0	0.0	0.5
High number of high commitment goals	-1.7	1.2	0.166	0.2	0.0	2.0
Low number of low commitment goals	Reference category					
Medium number of low commitment goals	-3.2	1.3	0.011	0.0	0.0	0.4
High number of low commitment goals	-0.8	1.1	0.499	0.5	0.1	4.3
Low number of high specificity goals	Reference category					
Medium number of high specificity goals	-1.7	1.1	0.135	0.2	0.2	1.7
High number of high specificity goals	-0.3	1.1	0.786	0.8	0.1	6.2
Low number of low specificity goals	Reference category					
Medium number of low specificity goals	-2.3	1.2	0.053	0.1	0.0	1.0

High number of low specificity goals	-2.7	1.2	0.025	0.1	0.0	0.7
Multivariate adjustment						
Low number of high commitment goals	Reference category					
Medium number of high commitment goals	-2.9	2.5	0.252	0.1	0.0	7.6
High number of high commitment goals	-1.4	3.4	0.690	0.3	0.0	187.7
Low number of low commitment goals	Reference category					
Medium number of low commitment goals	-2.8	2.5	0.270	0.1	0.0	8.6
High number of low commitment goals	21.5	8364.2	0.998	2135536305	0.0	.
Low number of high specificity goals	Reference category					
Medium number of high specificity goals	-1.5	2.4	0.522	0.2	0.0	23.2
High number of high specificity goals	-0.1	2.6	0.967	0.9	0.0	150.5
Low number of low specificity goals	Reference category					
Medium number of low specificity goals	-2.4	2.7	0.362	0.1	0.0	16.1
High number of low specificity goals	-23.1	8364.2	0.998	0.0	0.0	.

Univariate and logistic regression
Types of plans and weight outcomes

Figure 1: 95% confidence interval for total plans, types of
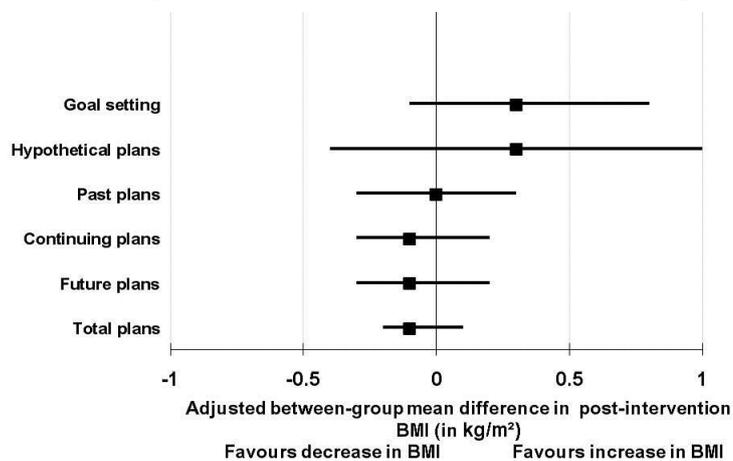

Figure 2: 95% confidence interval for total plans, types of plans
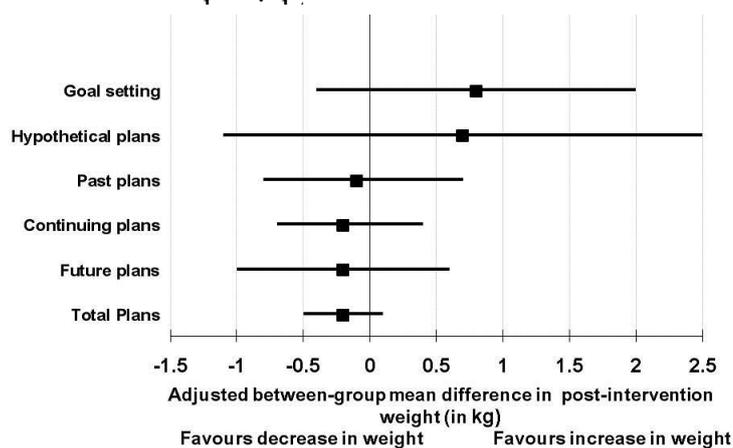
Figure 3: 95% confidence interval of odds ratio
for total plans, types of plans and maintaining a
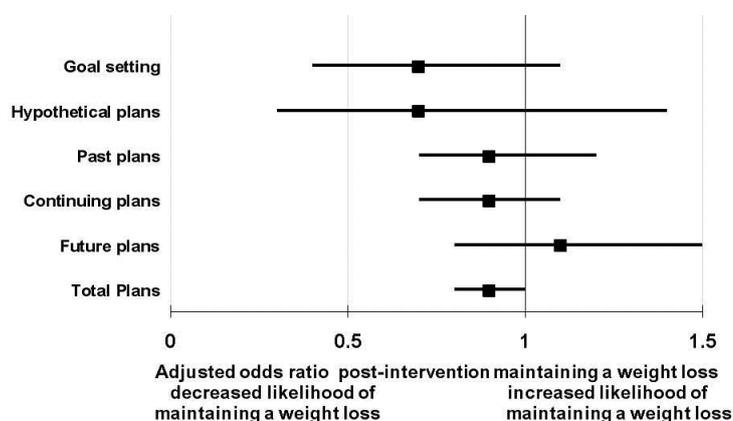
BMI and weight

The association between the type of plan and BMI and weight at follow up was investigated. The results indicate that future and continuing plans were associated with a potential decrease in BMI and weight. The results potentially show that there was a decrease in BMI of: 0.1kg/m²(Future plan) and 0.1kg/m² (continuing plan) per type of plan made (see figure 1). The results show that there was a potential decrease in weight of: 0.2kg (Future plan) and 0.2kg (continuing plan) per type of plan made (see figure 2). The 95% CIs were skewed towards benefit again showing support for the hypothesis that planning may help participants reduce their BMI and weight.

It appeared that past plans hypothetical plans and goal setting were not associated with a decrease in BMI and weight. They were not statistically significant and the 95% CIs were also skewed towards harm. This could mean that hypothetical plans and goal setting potentially increased BMI and weight.

Maintaining a weight loss
Different types of plans and their relationship with maintained weight loss at follow up was investigated using logistic regression. Only future plans were associated with an increased likelihood for participants to maintain their weight loss. The odds ratio was 1.1 with a 95% CI of (0.8 to 1.5) which could mean that future plans lead to a participant being 11% more likely to maintain their weight loss (See figure 3).

Continuing plans, past plans, hypothetical plans and goal setting were associated with a possible decrease in the likelihood of a participant maintaining their weight loss as indicated by the coefficients and 95% CIs.

Commitment, specificity, plans and goals and weight outcomes

Figure 4: 95% confidence interval for commitment specificity goals and plans and BMI
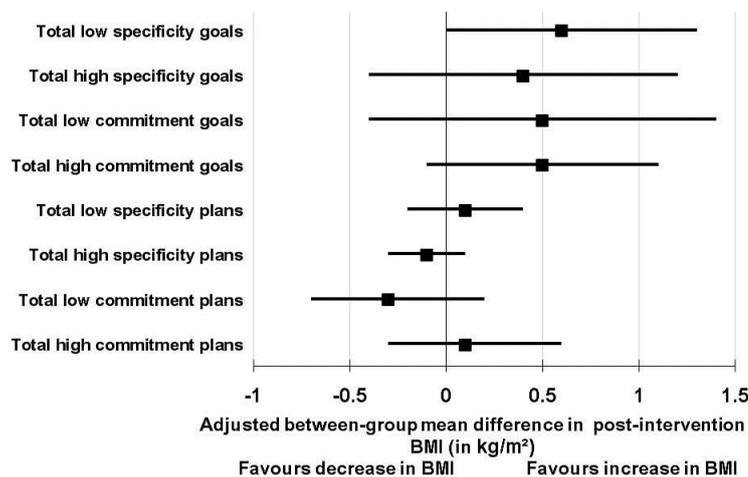
Figure 5: 95% confidence interval for
commitment specificity goals and plans and

Adjusted between-group mean difference in post-intervention
weight (in kg)

Favours decrease in weight   Favours increase in weight
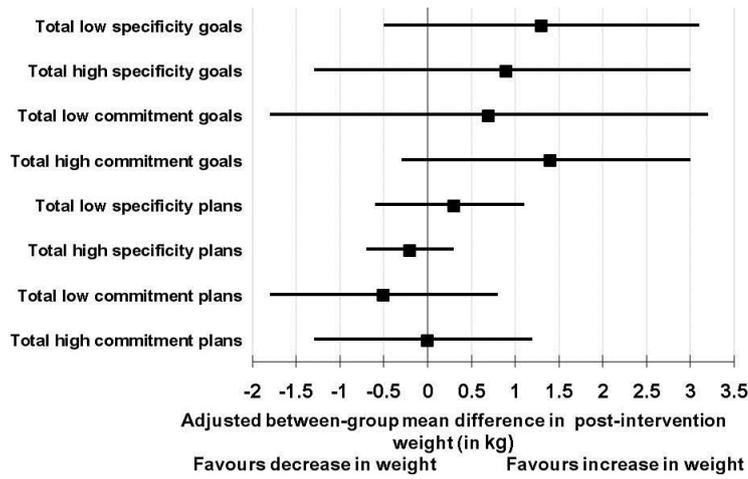
Figure 6: 95% confidence interval of the odds
ratio for commitment specificity goals and plans

Adjusted odds ratio post-intervention maintaining a weight loss
decreased likelihood of   increased likelihood of
maintaining a weight loss   maintaining a weight loss
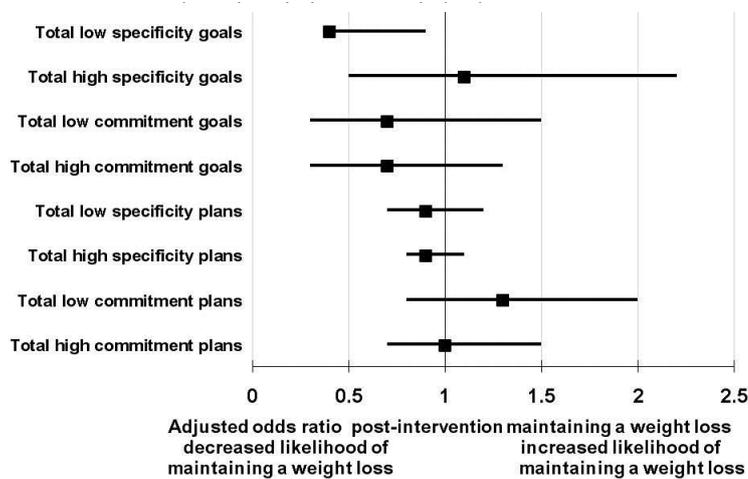
Commitment plans and outcome
BMI and weight

There seemed to be no effect for high commitment as indicated by the 95% CI. However when low commitment plans were examined there was an indication of a possible association between total low commitment plans and weight and BMI. The results suggest that for every additional low commitment plan made a participant could lose 0.5kg and their BMI could decrease by 0.3kg/m² (See figures 4 and 5). The 95% CIs were skewed towards benefit showing support that low commitment plans may help participants reduce their BMI and weight.

Maintaining a weight loss

Logistic regression was conducted to examine the association between total high and low commitment plans and proportion maintaining weight loss at follow up. The more low commitment plans that were made the more likely the participant was to maintain their weight loss. The odds ratio indicated that total low commitment plans lead to a participant being 29% more likely to maintain their weight loss (see figure 6). However when high commitment plans were examined the coefficient and 95% CI suggest that the more high commitment plans that were made the less likely the participant was to maintain their weight loss.

Specificity plans and outcomes

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BMI and weight

Figures 5 and 6 indicate that total high specificity plans were associated with a decrease in BMI and weight. It suggests that for every additional high specificity plan made a participant may possibly lose 0.2kg in weight and their BMI could decrease by 0.1kg/m². The 95% CIs were skewed towards benefit showing support that high specificity plans may help participants reduce their BMI and weight.

When examining total low specificity plans, however, the results suggest that they are not associated with a decrease in BMI or weight. The 95% CIs were skewed towards harm. This could indicate that total number of low specificity plans could increase BMI and weight.

Maintaining a weight loss

Total specificity plans were not found to be statistically significantly associated with maintaining a weight loss at follow up. Looking at both total high specificity plans and total low specificity plans the results suggested that the more high specificity and low specificity plans that were made, the less likely the participant was to maintain their weight loss. This indicates that total high specificity plans led to a participant being 6% less likely to maintain their weight loss (see figure 6). Total low specificity plans also led to a participant being 12% less likely to maintain their weight loss.

Commitment goals and outcomes
BMI and weight

Linear regression was conducted to examine the association between total commitment goals and weight/ BMI at follow up. It appeared that total high commitment goals and total low commitment goals were not associated with a decrease in BMI and weight. The 95% CIs were skewed towards harm. This could indicate that total number of high/low commitment goals could increase BMI and weight.

Maintaining weight loss

When examining the association between different total high commitment goals and proportion maintaining weight loss at follow up the full models were found not to be statistically significant. Looking at the total high and low commitment goals' coefficients and 95% CIs, they indicated that more high/low commitment goals that were made the less likely the participant was to maintain their weight loss.

Specificity goals and outcomes
BMI and weight

To investigate the relationship between the type of specificity used when setting a goal and each of weight and BMI, linear regression was used. The analysis suggested that total high and low specificity goals were not associated with a decrease in BMI and weight. The 95% CIs were skewed towards harm. This could indicate that total number of high and low specificity goals could increase BMI and weight.

Maintaining a weight loss

The more high specificity goals made it can lead to a participant being 8% more likely to maintain their weight loss. However looking at total low specificity goals, they are statistically significantly associated with a decreased likelihood in participant's maintaining their weight loss. The more low specificity goals that are made, the participants were 61% less likely to maintain their weight loss (see figure 6).

Multiple regression

Commitment, specificity for plans, goals and outcomes

Figure 7: Multiple regression: 95% Confidence interval for commitment and specificity and BMI

Adjusted between-group mean difference in post-intervention BMI (in kg/m²)

Favours decrease in BMI   Favours increase in BMI
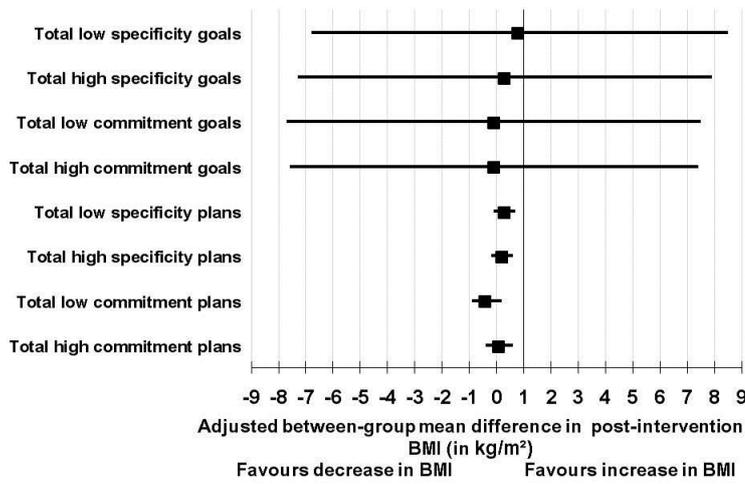
Figure 8: Multiple regression: 95% Confidence interval for commitment and specificity and weight

Adjusted between-group mean difference in post-intervention weight (in kg)
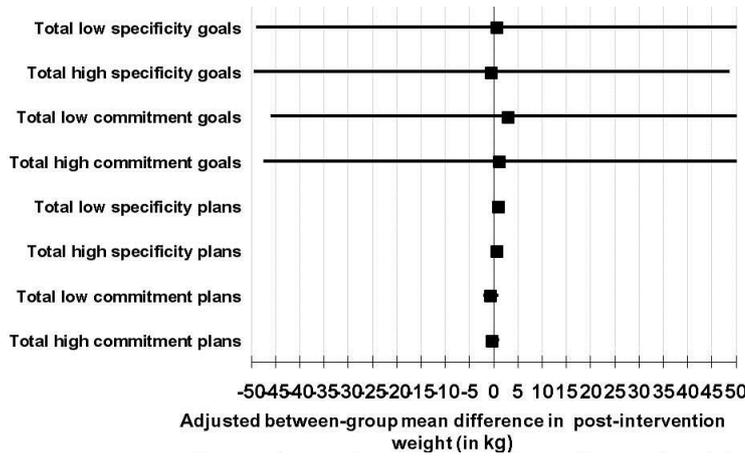
Figure 9: Multiple regression: 95% Confidence interval of odds ratio for commitment and specificity and maintaining a weight loss


Adjusted odds ratio post-intervention maintaining a weight loss

decreased likelihood of maintaining a weight loss   increased likelihood of maintaining a weight loss
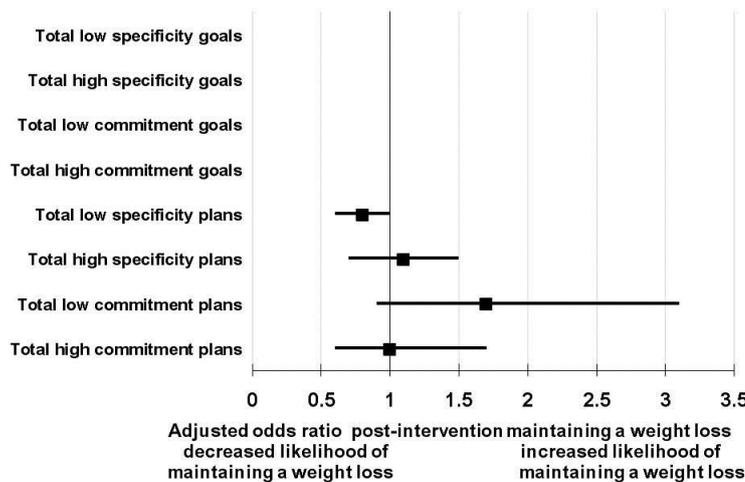
Commitment, specificity for plans and outcomes
BMI and weight

The association between commitment, specificity and weight and BMI at follow-up was also examined. Total high and low commitment plans were associated with a decrease in weight. These results indicate that, for every one low commitment plan made a participant's weight could decrease by 0.6kg and for every one high commitment plan a participant's weight could decrease by 0.3kg. The findings also suggested that total low commitment plans were possibly associated with lower BMI, for every one low commitment plan made a participant their BMI may decrease by 0.4kg/m². However, looking at high commitment it appeared that there was no association with BMI. It was associated with a potential decrease in weight as indicated by Figure 8.

When examining specificity the results indicate that total high specificity plans and total low specificity plans were not associated with a decrease in weight and BMI. This is indicated by the 95% CI as they are skewed towards harm and the coefficient was also a positive value.

Maintaining a weight loss
The association between commitment and specificity plans and maintaining a weight loss at follow-up was also examined. Again the models were not statistically significant. Low commitment plans appeared to be associated with an increased likelihood of maintaining a weight loss. The odds ratio was 1.7 with a 95% CI of (0.9 to 3.1). This suggests that low commitment plans could lead to a participant being 70% more likely to maintain their weight loss (see figure 9). High commitment plans were not associated with an increased likelihood of maintaining a weight loss.

High specificity plans were also associated with an increased likelihood of a participant maintaining their weight loss as the 95% CI is skewed towards harm. Low specificity plans appeared to possibly decrease the likelihood of maintaining a weight loss. This is due to the 95% CI being skewed towards zero.

Commitment, specificity for goals and outcomes
BMI, weight and maintaining a weight loss
Multiple regression was conducted to examine the association between commitment goals, specificity goals and weight outcomes at follow up. However, when the analysis was conducted at this level there were not enough participants within the study to demonstrate any effects. This is highlighted by the large confidence intervals.

Categorisation variables and weight outcomes
Further analysis was conducted examining the variables trichotomised into high medium and low. This took into account that there may not be a linear relationship between planning and WLM outcomes. The medium and high categories were compared to the low category of each variable.

Univariate, logistic and multiple regression
Types of plans and weight outcomes

BMI

Figure 10: 95% Confidence interval for categorised types of plans and BMI

Adjusted between-group mean difference in post-intervention BMI (kgm²)

Favours decrease in BMI   Favours increase in BMI
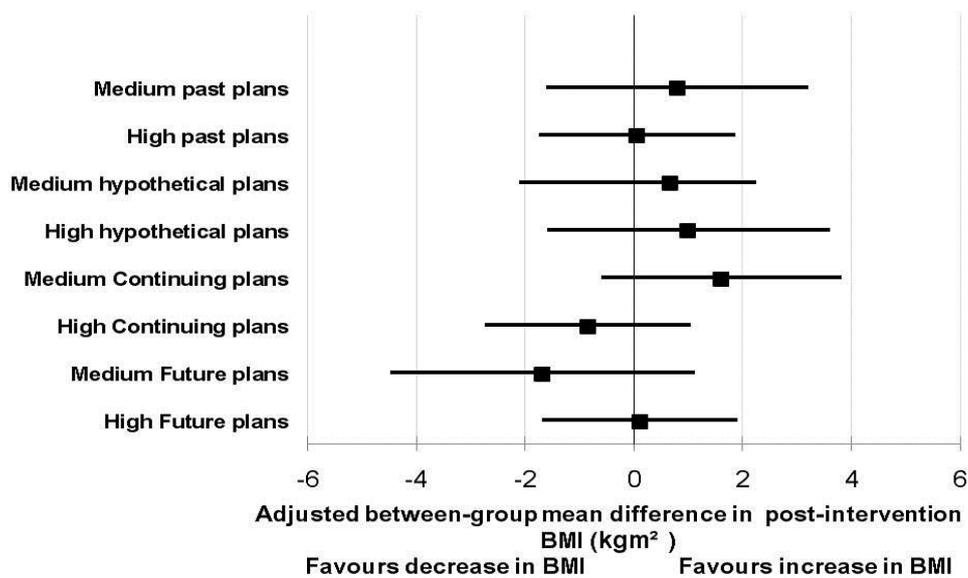
Examining plans and BMI the associations are again statistically non-significant. Medium continuing planners compared to low continuing planners potentially increased their BMI per plan by 1.6 kgm² (95% CI) (see figure 10). Those who were frequent medium future planners lost on average 1.7 kgm² (95% CI) (see figure 10) more than those who were low planners. High future, continuing and past and medium hypothetical planners were more similar to low planners (95% CI).

Weight

Figure 11: 95% Confidence interval for categorised types of plans and weight

Adjusted between-group mean difference in post-intervention weight (in kilograms)

Favours decrease in weight   Favours increase in weight
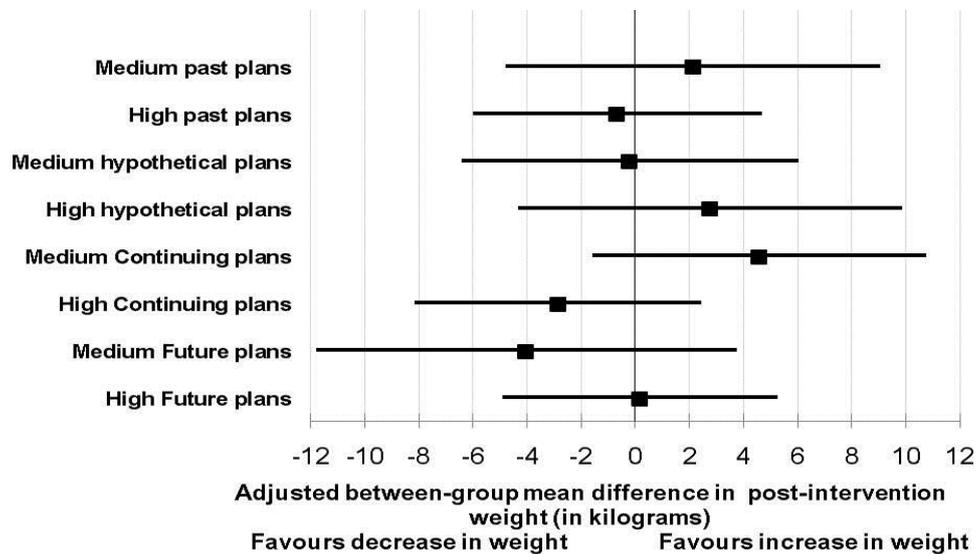
Those who were frequent continuing planners and medium future planners lost on average 4 kg (future planners) and 2.9kg (continuing planners) (95% CI) (see figure 11) more than those who were low planners, albeit not statistically significantly. Frequent hypothetical planners and medium continuing and past planner increased in weight compared to low planners (adjusted estimate: continuing planners 4.6kg, Hypothetical planners 2.8kg, past planner 2.1kg 95% CI) (see figure 11). Medium hypothetical, high

future and past planners were more similar to low planners for weight and BMI (95% CI).

Maintaining a weight loss

Figure 12: Odds ratio for categorised types of plans and maintaining a weight loss
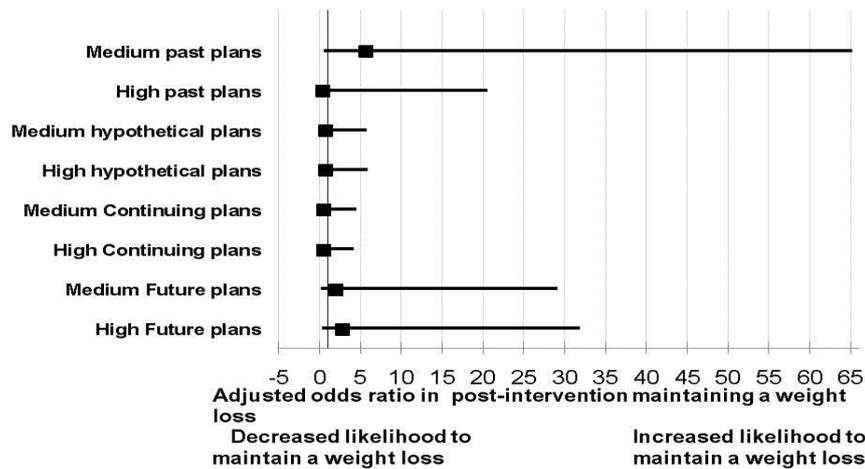
Logistic regression was conducted to examine the association between types of plans and proportion maintaining weight loss at follow up. Those who were frequent and medium future and past planners were potentially more likely to maintain a weight loss (95% CI) compared to those who were low planners, albeit not statistically significantly. However, those who were frequent and medium continuing and hypothetical planners were potentially less likely to maintain a weight loss (95% CI) compared to those who were low planners.

Commitment, specificity plans and weight outcomes
BMI

Figure 13: 95% Confidence interval for categorised commitment and specificity and BMI
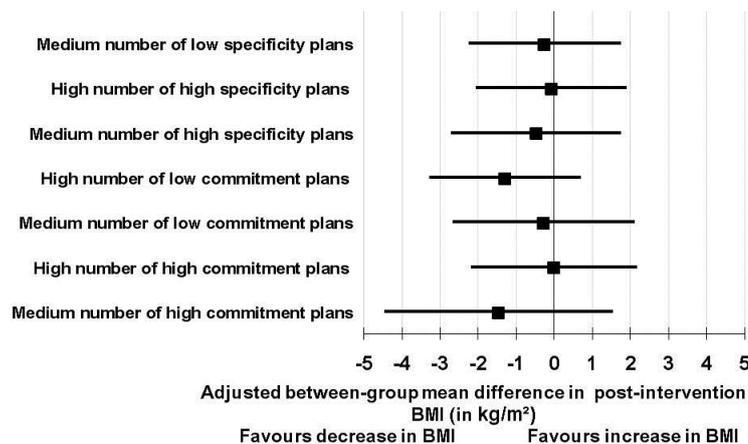
Figure 14: Multiple regression: 95% Confidence interval for categorised commitment and specificity and BMI

High no. of low specificity plans
Medium no. of low specificity plans
High no. of high specificity plans
Medium no. of high specificity plans
High no. of low commitment plans
Medium no. of low commitment plans
High no. of high commitment plans
Medium no. of high commitment plans

-6   -4   -2   0   2   4   6

Adjusted between-group mean difference in post-intervention BMI(kgm²)

Favours decrease in BMI   Favours increase in BMI
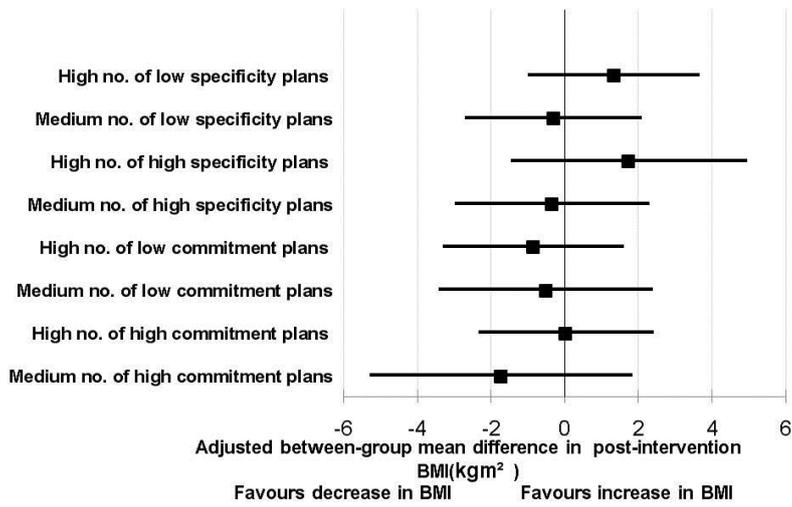
Weight

Figure 15: 95% Confidence interval for categorised commitment and specificity and weight

High number of low specificity plans
Medium number of low specificity plans
High number of high specificity plans
Medium number of high specificity plans
High number of low commitment plans
Medium number of low commitment plans
High number of high commitment plans
Medium number of high commitment plans

-14-13-12-11-10-9-8-7-6-5-4-3-2-1 0 1 2 3 4 5 6 7 8

Adjusted mean post-intervention weight loss (kg)
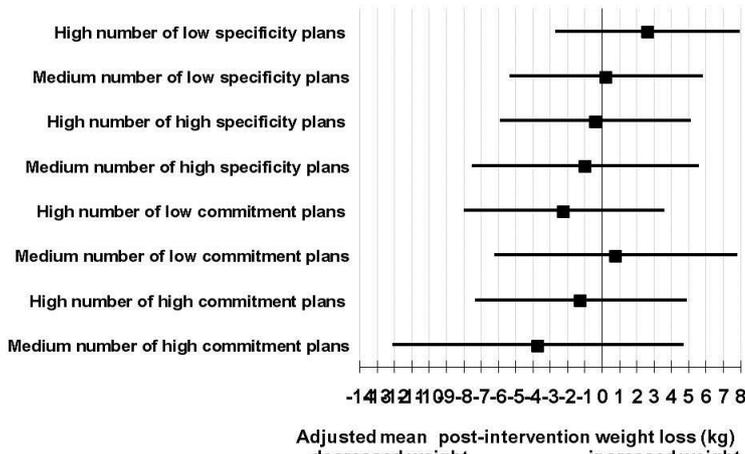
Figure 16: Multiple regression: 95% Confidence interval for categorised commitment and specificity and weight

High no. of low specificity plans
Medium no. of low specificity plans
High no. of high specificity plans
Medium no. of high specificity plans
High no. of low commitment plans
Medium no. of low commitment plans
High no. of high commitment plans
Medium no. of high commitment plans

-16-14-12-10-8 -6 -4 -2 0 2 4 6 8 10 12 14 16

Adjusted between-group mean difference in post-intervention weight (in kilograms)

Favours decrease in weight   Favours increase in weight
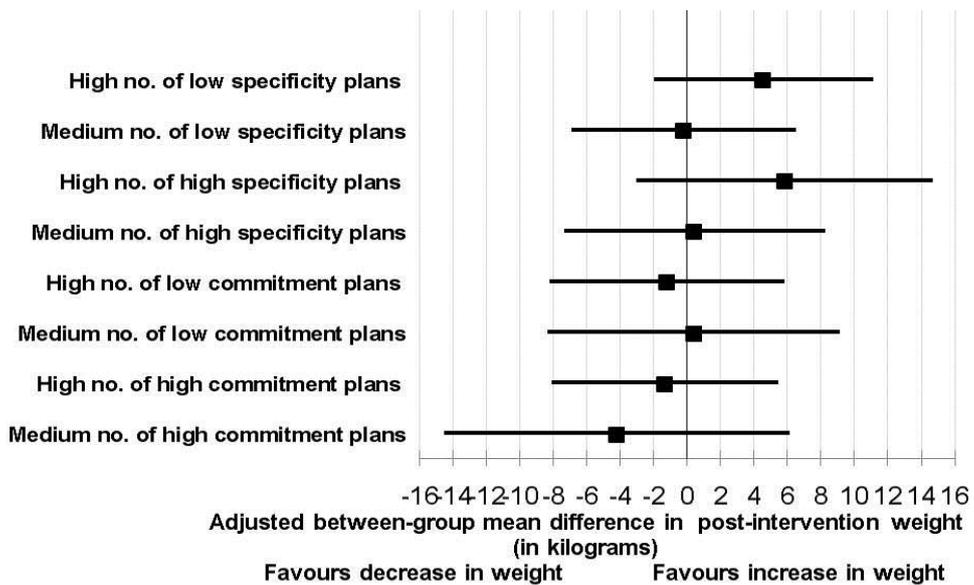
Maintaining a weight loss

Figure 17: 95% Confidence interval of odds ratio for categorised commitment and specificity and maintaining a weight loss

Adjusted odds ratio post-intervention maintaining a weight loss
decreased likelihood of   increased likelihood of
maintaining a weight loss   maintaining a weight loss
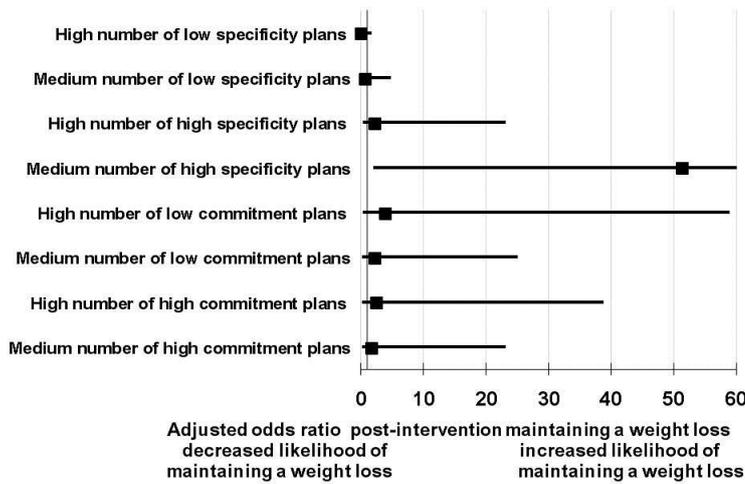
Commitment, specificity goals and weight outcomes
BMI

Figure 18: 95% Confidence interval for categorised commitment and specificity and BMI

Adjusted between-group mean difference in post-intervention
BMI (in kg/m²)
Favours decrease in BMI   Favours increase in BMI
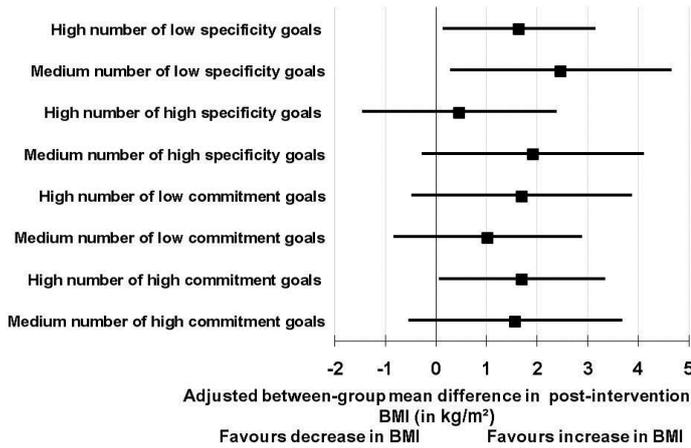
Figure 19: Multiple regression: 95% Confidence interval for categorised commitment and specificity and BMI

Adjusted between-group mean difference in post-intervention BMI (in kgm²)
Favours decrease in BMI   Favours increase in BMI
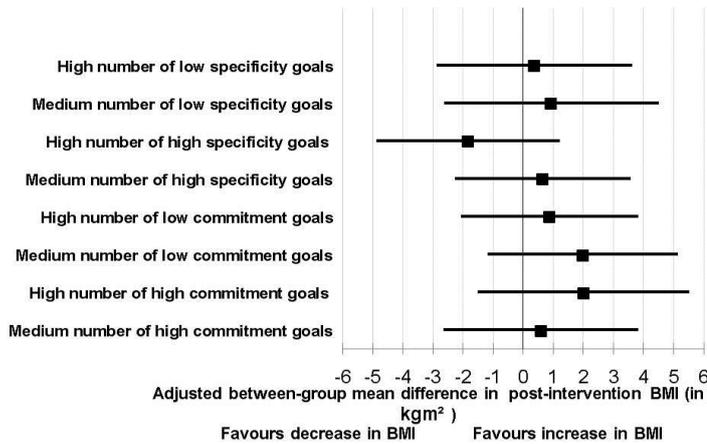
Weight

Figure 20: 95% Confidence interval for categorised commitment and specificity and weight

Adjusted mean post-intervention weight loss (kg)
decreased weight   increased weight
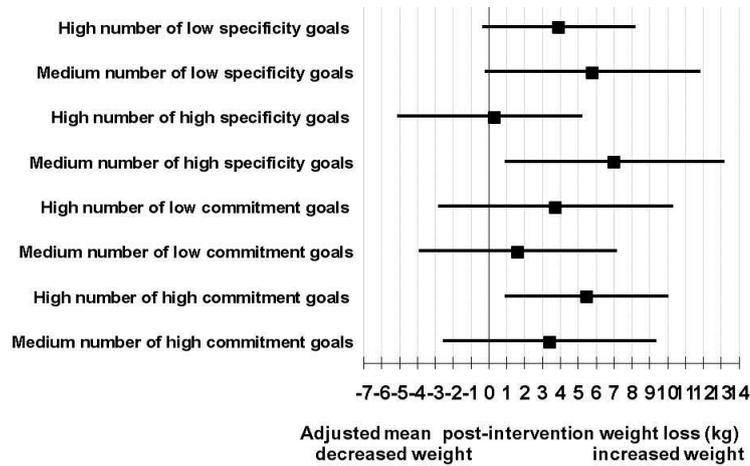
Figure 21: Multiple regression: 95% Confidence interval for categorised commitment and specificity and weight

Adjusted between-group mean difference in post-intervention weight
(in kilograms)
Favours decrease in weight   Favours increase in weight
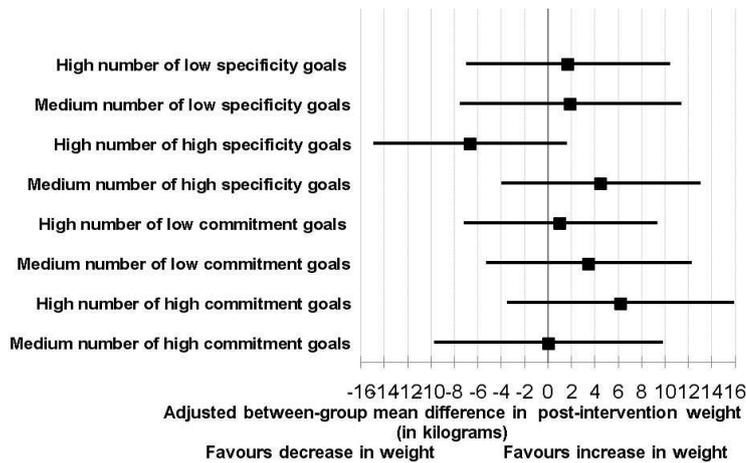
Maintaining a weight loss

Figure 22: Odds ratio for categorised commitment and specificity and weight

Adjusted odds ratio in post-intervention maintaining a weight loss
Decreased likelihood to   Increased likelihood to
maintain a weight loss   maintain a weight loss
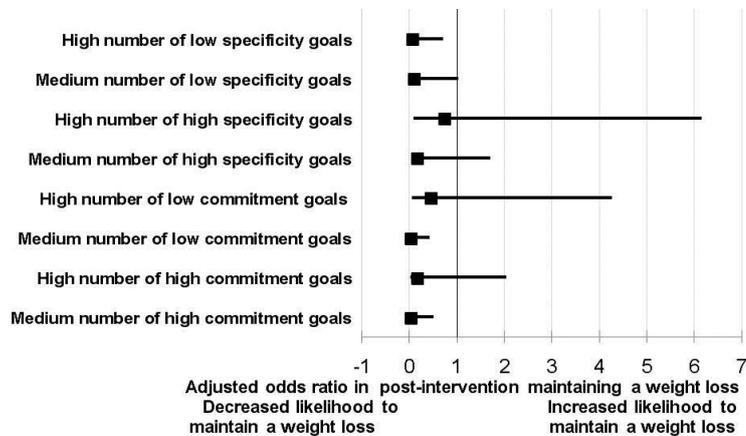
We also examined whether how committed a person was to a plan/goal or how specific a plan/goals was could be associated with the weight outcomes. However when the analysis was conducted at this level there was not enough participants within the study to demonstrate any effects. This is highlighted by the large confidence intervals. Therefore I cannot draw any inferences from these results.

Appendix C7-1 Coding framework for thematic analysis

Top level node	Sub-node 1	Description	Sub-node 2	Description
Reflections	Perception check	It is usually in the form of a brief question, e., "It sounds like...," "Let me see if I understand this," which allows the client to agree or disagree with the accuracy of your paraphrasing.		
	Reflecting negative statements	Reflecting only the negative elements of what the client has said.		
	Complex reflections	An interviewer reflection that adds additional or different meaning beyond what the client has just said; a guess as to what the client may have meant.	Amplified reflection	This is similar to a simple reflection, only the counsellor amplifies or exaggerates the point to the point where the client may disavow or disagree with it. It is important that the counsellor not overdo it, because if the client feels mocked or patronized, he or she is likely to respond with anger.
			Simple reflection	One way to reduce resistance is simply to repeat or rephrase what the client has said. This communicates that you have heard the person, and that it is not your intention to get into an argument with the

				person.
			Double sided reflection	With a double-sided reflection, the counsellor reflects both the current, resistant statement, and a previous, contradictory statement that the client has made.
			Reframing	Reframing is a strategy in which you invite clients to examine their perceptions in a new light or a reorganized form. In this way, new meaning is given to what has been said
Questions	Direct planning or goal setting	Asking directly what plans would a client like to make or what goals would they like to set.		
	Leading question with intention to give information	A question which directs the conversation to enable the counsellor to give the client some information.		
	Closed question	Closed questions that are leading; they target specific information and give the client very little room to move.		
	Open question	Open ended questions facilitate a client's response to questions from his or her own perspective and from the area(s) that are deemed important or		

		relevant. This provides the opportunity for clients to express their point of view, and for counsellor s to discover and follow the client's perspective.		
	Evoking positive feeling/ language	Asking the client what they enjoy/ what they feel about a particular thing/activity.		
Summary	Past achievements	Summaries what the client has achieved to date.		
	Summary of session	Summary of what was discussed in present session		
	Summary of previous sessions topics	Summary of ideas that were discussed in previous session. This can include goals and plans that were discussed.		
Exploration	Asking client to expand on their ideas	Asking client to give more detail about their idea.		
	Exploring clients self-awareness	Electing in depth talk about the clients self-awareness.		
	Exploring plan ideas or how a plan would look without clients commitment to it	Asking the client about what ideas they have to change their behaviour or exploring what an idea could look like in action.		
	Exploring motivation or reason for change	Electing in depth talk about the clients motivation/ reason for change.		
	Exploring clients feelings	Asking client to give more detail about their feelings.		
	Facilitators	Previous actions that have worked		

		for the client or things that they find helps them		
	obstacles	Asking the client to think about what could stop them achieving something		
	Exploring past situations	Getting the client to generate ideas about what they could have done differently in the past in order to try and get them to implement these ideas in the future. Exploring what happened in the past such as past achievements.		
	Pros and cons	Exploring the pros and cons of a situation		
Information	Giving information with permission	Supplying data, opinions, facts, resources or answers to questions. Explore with client possible problems which may delay or prevent their change process. In collaboration with the client identify possible solutions and alternatives.		
	Giving information without permission	Supplying information to the client when the therapist has not asked permission to do so.		
	Questions designed to gather information about the client	Asking the client questions about themselves.		
Desire/	Exploring	Asking what the		

action	clients desires	client would like to achieve or exploring these desires in detail.		
	How can client change desires into action	Asking how the client's desires to achieve something can be turned into action.		
Affirm	Affirming clients motivation	Actively listening for the client's motivation and to reflect those to the client in an affirming manner.		
	Affirming clients self-awareness	Actively listening for the client's self-awareness and to reflect those to the client in an affirming manner.		
	Affirming and focusing on positive action	Actively listening for the client's positive actions and to reflect those to the client in an affirming manner.		
Importance scale	Importance scale	Scaling questions: On a scale where one is not at all important, and ten is extremely important, how important (need) is it to you to change _____?		
Talk not related to WLM	Talk not related to WLM	Statements or questions that are about topics not related to WLM or arranging future appointments.		
Rolling with resistance	Rolling with resistance	Resistance can also be met by rolling with it instead of opposing it. There is a paradoxical element in this, which often will bring the client back to a balanced		

		or opposite perspective. This strategy can be particularly useful with clients who present in a highly oppositional manner and who seem to reject every idea or suggestion.		
Space to tell story	Space to tell story	Allowing the client the space they need to continue with their story. Not jumping in to early before the client has finished where they were going.		
Empathy	Empathy	Showing empathy and understanding.		
MI inconsistent behaviour	MI inconsistent behaviour	Therapist behaviour which is not in line with the beliefs of MI		