

An examination of the process of Motivational Interviewing in the anxiety disorders

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Thesis Summary

Motivational interviewing (MI) is a collaborative, client-centered therapy style that aims to prepare people for behaviour change by helping them to explore and resolve ambivalence (Miller & Rollnick, 2002, 2013). MI was originally developed to treat problematic substance use but is increasingly used as both a stand-alone and adjunctive treatment for a variety of physical and mental health concerns. Proposed mechanisms of MI's success have been well specified, however, most research that examines MI mechanisms and particularly MI's proposed causal model has been conducted in the realm of substance use. Little is known about the generalizability of MI mechanisms from the substance use literature to the other problem areas where MI is being applied. The current thesis aims to address this gap by investigating the process of MI in areas beyond substance use. The thesis combines different approaches to address this central question.

The first two papers investigate the current state of MI mechanism research. Paper One is a systematic review of evidence for the causal chain model proposed by Miller and Rose (2009). The review draws together research that tests paths of the causal chain in varying treatment domains. Overall, the results provided support for the link between therapist MI-consistent behaviors (MICO) and client change language, and between client language and treatment outcome. In terms of the relational hypotheses, therapist relational style factors were not consistently related to change language or outcome, however studies that employed experimental designs that isolated the effect of MI relational components did demonstrate positive effects of therapist interpersonal style. Paper Two is a meta-analysis that investigates MI mechanisms of change in populations diagnosed with mood, anxiety, psychotic, and eating disorders, and patients with comorbid mental health conditions. Pooled effect sizes demonstrated that the application of MI was related to specific therapist and client behaviors, and that client behaviors may predict treatment outcome. Moreover, there did appear to be some support for the effect of MI in increasing motivation and treatment

engagement (homework compliance and treatment attendance), particularly in the context of anxiety disorders. Nevertheless, a caveat of the effect of MI on motivation and engagement is that studies generally did not employ control conditions. Taken together, the review papers pointed to limited use of control conditions and few investigations of therapist behaviors and change language in the context of anxiety disorders. Therefore, the final three papers of this program of research aim to overcome these limitations and are dedicated to an empirical examination of MI processes in the context of social anxiety disorder (SAD). Each paper employs a sample of adults diagnosed with SAD who were randomised to receive either an MI-style treatment called Treatment Expectations and Engagement (TEE) or a supportive counselling control condition (SC) before all received group Cognitive Behavioural Therapy (CBT) for SAD.

Paper Three investigates the capacity of MI to decrease ambivalence for people with social anxiety and whether levels of ambivalence are related to treatment outcome. Overall, Paper Three provided mixed support for the relationship between MI and ambivalence in a socially anxious population. MI was not shown to decrease ambivalence, either general ambivalence, treatment ambivalence, or ambivalence related to specific CBT tasks, however, the condition to which participants were allocated did moderate the effect of some measures of baseline ambivalence on treatment outcome. Also, higher CBT task-related ambivalence was related to higher social anxiety symptoms during the CBT program. Together, the findings suggest that while MI might not decrease ambivalence it may alleviate a negative effect of ambivalence on treatment outcome. Paper Four employs observational coding methods to examine the transition between therapist and client behaviour during MI sessions for social anxiety. Consistent with the proposed causal chain of MI, therapist MICO behaviors were more likely to precede client change talk (CT), while MI-inconsistent behaviors (MIIN) were more likely to precede neutral client language and less likely to precede CT. MICO behavior was also more likely to precede counter-change talk (CCT), suggesting that it may

facilitate change exploration in general. Furthermore, the findings highlighted the importance of particular types of MICO behaviors particularly open questions and valenced reflections.

Taken together, the findings of Paper Four supported the first step of the MI causal model in the context of social anxiety, though the study did not examine whether therapist and client behaviors predicted treatment outcome. Thus the final empirical paper of this thesis had this as an aim. Paper Five further explores the relationship between therapist behaviours and client language in MI, as well as the relationship between therapist and client variables and outcome. Overall, the results of Paper Five supported some elements of the MI causal model in the context of SAD, but not all. First, the TEE condition was generally distinguishable from the SC condition according to MI relevant behaviors, which suggests that TEE was being conducted in an MI fashion. Second, while the MICO behavior category did not predict change language, MI Spirit and specific therapist behaviors did, with MIIN also predicting a greater frequency of CCT. Lastly, therapist and client behaviors did not predict treatment outcome, thus the role of client language as a mediator of treatment outcome was not investigated.

Taken together, the results of the empirical papers suggest that elements of the theorized process of MI are relevant to social anxiety treatment, and that while not all hypotheses were supported, there is reason to suggest that these processes should be further investigated within this context. An overall implication of the current thesis is that while each empirical paper contributes to MI process research, they also highlight the complexity associated with understanding how particular MI mechanisms contribute to outcome.

Statement of Candidature

I certify that the work of this thesis entitled “An examination of the process of Motivational Interviewing in the anxiety disorders” has not been previously submitted for a degree to any other university or institution.

All work related to these research studies has been carried out by myself under the supervision of Dr. Lorna Peters. The individual contributions of co-authors on the five papers presented in this thesis are clarified in the title page of the relevant chapter.

Macquarie University Ethics Committee approval was obtained for all aspects of the research studies presented in this thesis (Protocol number: 5201100907).

Mia Romano

Date

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Chapter 1

General Introduction

Introduction

Motivational interviewing (MI) is a collaborative, client-centered therapy style that aims to prepare people for behavior change and strengthen their motivation for change by helping them to explore and resolve ambivalence (Miller & Rollnick, 2002, 2013). MI was originally developed to treat problematic drinking but has since been used as both an adjunctive and stand-alone treatment in a variety of physical and mental health domains. Research conducted predominantly in the realm of substance use has begun to establish elements of MI that may account for treatment efficacy. The current thesis aims to extend this research by investigating the process of MI in problem areas beyond substance use. The thesis focuses on first establishing the state of evidence for MI mechanisms in the treatment of mental health problems, and then examines MI mechanisms in the context of social anxiety disorder (SAD). This chapter will begin with a discussion of the essential ingredients of the MI therapy style and proposed causal elements. A review of MI as an adjunctive treatment for mental health concerns will then be presented, followed by a review of research relating to MI processes in the context of anxiety disorders. Finally, a discussion of SAD and a rationale for the use of MI prior to cognitive behavioral treatment (CBT) for SAD in particular will be presented.

Motivational Interviewing

In its original applications within the addiction field, MI offered an alternative to typical treatment approaches where counselors would often confront the client about problematic behaviors and blame them for denying problems and resisting or failing to respond to treatment (Miller & Rollnick, 2004; White & Miller, 2007). MI differed from typical substance use treatments in how it dealt with and conceptualized client resistance. The manifestation of resistance in the field of MI is conceptualized as client expression of ambivalence towards behavior change, the expressions of which are thought to be amplified

by directive and confronting counseling techniques (Miller & Rollnick, 2002). MI theorists see substance users as a population very ambivalent about the idea of behavior change, particularly due to the physically and mentally rewarding nature of substance use (Miller & Rollnick, 1991). Ambivalence suggests the experience of competing motivations between wanting to change and not wanting to change; in the case of substance use, for example, there is a conflict between being aware of the negative impact of substance use and not wanting to sacrifice the positive experience that substance use provides. This conflict or ambivalence is seen as a key obstacle to change, with most clients who present for treatment or who are forced into treatment by others thought to still harbor reservations about behavior change that will impact on the change process (Miller & Rollnick, 2004). The principal aim of MI is to address this ambivalence, to help clients work through and resolve ambivalence to tip the balance in favor of changing, and enhance motivation and commitment to their behavior change goal (Miller & Rollnick, 1991, 2002, 2013). A second type of resistance suggested to arise during MI is interpersonal, reflecting an opposition to the therapist or direction of the therapy (Miller & Rollnick, 2013). While this type of resistance has typically been viewed as a client characteristic, it is thought to arise from the therapist's directive management of ambivalence, pushing the client towards change when they are not ready, culminating in a lack of collaboration between therapist and client to achieve the behavior change goal (Westra & Aviram, 2013).

Miller and Rollnick (1991, 2002, 2013) suggested that the key to helping substance users overcome this resistance (both ambivalence and interpersonal resistance) resided within the therapeutic relationship. In its simplest form, MI is a particular type of discussion about change, which draws upon the client centered approach of Carl Rogers (Rogers, 1959). The therapeutic relationship in MI is one characterized by acceptance and empathic understanding established through therapist reflective listening skills, evocative questions, and non-judgmental or confronting behavior. MI is characterized by a particular spirit or "way of

being” with clients that is fundamental to engaging the client in the change process. MI therapists are required to embody this MI spirit; they do not take an expert role but rather strive to create a collaborative partnership with the client, emphasizing the clients’ autonomy and expertise in decisions about change, placing the onus for change on the client. Therapists also aim to evoke the clients’ own reasons, motivations, and commitment for change, the expectation being that change will best be achieved if based upon the clients’ own ideas (Miller & Rollnick, 2013). Since its inception the essential elements of MI spirit (collaboration, autonomy, evocation, and empathy) have not changed. Other elements that have been added as the method has developed are acceptance and compassion, elements intended to convey that the therapist is working in the client’s best interest (Westra & Aviram, 2013). Beyond the relational style of MI that encompasses an expression of empathy and a capacity of the therapist to “roll with resistance”, MI therapists also aim to support self-efficacy, develop discrepancy, and facilitate change talk. Increasing client self-efficacy for change further enhances client autonomy. If a client believes they have the capacity to change, change will be more likely (Miller & Rollnick, 2002). Developing discrepancy is thought to enhance client motivation because the client is enlightened to the way their problematic behaviors impact their ability to achieve important life goals.

The application of MI involves combining specific communication skills and techniques into a framework of MI Spirit and general principles. MI therapists employ client-centered counseling skills and specific therapeutic techniques to bring to life the spirit and style of MI and are proscribed from using behaviors that would diminish the client/therapist relationship strived for during MI. MI-consistent behaviors include a range of micro counseling skills, for example, open-ended questions, affirmations, complex reflections, and summaries. MI-inconsistent behaviors include things like confronting or blaming the client, warning, giving advice or raising concern without permission, and general authoritative or confrontational behaviors (Miller & Rollnick, 2013). These behaviors do not support the

collaborative nature of the therapist/client relationship and may reflect an inability of the therapist to relinquish the “expert” role (Miller & Rollnick, 2004). The negative impact of authoritative and confrontational behaviors has been shown to increase client resistance dramatically in comparison to more empathic and reflective approaches (Miller, Benefield, & Tonigan, 1993; Patterson & Forgatch, 1985). While drawing on the approach of Carl Rogers in terms of the therapeutic relationship, one area in which MI departs from a Rogerian style is that MI is directive; MI therapists consciously employ MI-consistent techniques in a way which directs the conversation towards eliciting and strengthening the client’s motivation and commitment to change. MI therapists’ focus on client speech, they seek to selectively elicit and strengthen client arguments for change (change talk (CT)), while avoiding strengthening arguments that favor the status quo, or not changing (sustain talk (ST) or counter-change talk (CCT)) (Miller & Rollnick, 2004; Miller & Rose, 2009). The expectation is that in an atmosphere of collaboration and acceptance, and as facilitated by the therapist, the client will talk themselves into changing their behavior (Miller & Rollnick, 1991, 2002, 2013). The emphasis on change language is one that is thought to separate MI from other modes of psychotherapy and is suspected to underlie the effectiveness of MI treatment (Apodaca & Longabaugh, 2009; Miller & Rose, 2009).

In short, MI aims to enhance client motivation and capacity to change through the combination of specific therapeutic skills and techniques that occur in an atmosphere of MI Spirit, empathy, and acceptance. Although this style of psychotherapy has shown efficacy, particularly in treating substance use disorder, not all studies have shown positive effects, which suggests a need to determine the underlying ingredients of MI efficacy (Magill et al., 2014).

The MI Causal Model. In attempting to elucidate how MI may work, MI has been linked to theories focusing on language processes in behavior change and motivation, for example, self-perception theory (Bem, 1972), speech act theory (Austin, 1962; Searle, 1969), self-regulation

theory (Kanfer, 1986), self-determination theory (Deci & Ryan, 1985), and the theory of reasoned action (Ajzen & Fishbein, 1980) (Bricker & Tollison, 2011). Self-perception theory and speech act theory appear to be particularly relevant to the process of MI due to the emphasis on client speech. Self-perception theory posits that individuals infer their attitudes about something from observing their own behavior, an example of which may be observing one's own speech (Bem, 1972). Miller (1983) suggested that if a client continually hears their own arguments for change then their attitudes about the benefits of changing will be strengthened, thereby leading to observable behavior change. Speech act theory has also been applied toward understanding how MI operates in the interaction between the client and therapist (Bricker & Tollison, 2011). Speech act theory describes how language obligating the speaker to perform an action in the future (e.g., I will stop drinking) is predictive of that behavior actually taking place (Austin, 1962; Searle, 1969). The obligatory nature of these self-generated statements is posited to drive behavior change and research in MI processes has indicated that language with an imperative nature, namely commitment language, has been linked to better client outcome for substance use treatments (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003).

Building on speech act theory, Miller and Rose (2009) proposed a theoretical model of how MI changes behavior. The causal chain model suggests that therapist use of MI-consistent techniques facilitates and elicits the expression of CT while attempting to minimize the expression of ST. Ideally continued expression of CT and decreases in the expression of ST influences client ambivalence and tips the balance in favor of change (Moyers, 2014). Therefore, expression of CT is predicted to relate to positive behavior change, while ST is thought to result in worse client outcome, with CT posited to be a mediator of the effect of MI on treatment outcome (Miller & Rose, 2009). The model also supports the importance of the therapeutic relationship as having a direct impact on client outcome, as well as facilitating the expression of client language in favor of change (Moyers, 2014). Meta-analytic research in

substance use populations and also in the treatment of health behaviors has supported elements of this causal model (Apodaca & Longabaugh, 2009; Copeland, McNamara, Kelson, & Simpson, 2015; Magill et al., 2014). Namely, Apodaca and Longabaugh found that client CT and MI-inconsistent behavior consistently differentiated MI from control groups, and CT was related to better client outcome while the use of MI-inconsistent behavior such as confrontation, labeling, and judgment contributed to worse client outcome. Supporting the importance of MI's relational style, Copeland et al. (2015) found that, in the treatment of health behaviors, MI spirit was one of the most consistent candidates as an MI mechanism of change. Finally, in reviewing evidence for the causal model specifically, Magill et al. (2014) found that MI-consistent behaviors were positively related to CT while MI-inconsistent behaviors were negatively related to CT and positively related to ST. CT was not significantly associated with outcome in the reviewed studies, but ST was related to worse client outcome. Due to initial applications of MI as a treatment for problem drinkers, most of the research investigating model paths has been conducted within the field of addictive behaviors however there is a growing application of MI in diverse treatment domains. In this thesis, a systematic review of evidence for the causal chain model proposed by Miller and Rose in diverse treatment domains is provided in Chapter Two. Foreshadowing the conclusions from Chapter Two, there appeared to be support for the relationship between MICO and change language, and between client language and treatment outcome. More detail is provided in Chapter Two.

The Application of MI Beyond Substance Use

The original application of MI in the treatment of problematic drinking was as a method for helping clients prepare for behavior change by helping them overcome motivational obstacles to change. MI was used in order to increase the likelihood of the person entering and engaging in typical treatment for their problematic behavior, with the expectation that the benefits of treatment programs would be enhanced (Miller & Rollnick,

2004). Supporting this rationale, meta-analyses of MI treatment have shown that a major outcome of adjunctive MI in treating addictive behaviors is increased attendance and involvement in more action oriented therapies (Burke, Arkowitz, & Menchola, 2003; Hettema, Steele, & Miller, 2005). Furthermore there does appear to be a synergistic effect on client outcome when MI is joined to other evidence based counseling methods when treating substance use and those with dual diagnoses (Burke et al., 2003). For example, a meta-analysis comprising 12 studies of integrated MI and CBT for comorbid alcohol use and depression demonstrated the long-term advantage of integrative MI in that effect sizes from post-treatment were nearly doubled at the 12-month follow-up (Riper et al., 2013).

The success of MI as both a stand-alone and adjunctive treatment in the realm of substance use suggested the possibility that MI could provide a conceptual foundation for clinical interventions for a range of physical and mental health concerns (Miller & Rollnick, 2004). Meta-analytic research provides support for the efficacy of MI in the treatment of diet and exercise concerns and diabetes (Martin & McNeil, 2009), gambling and general health promoting behaviors (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010), and a positive impact on patient confidence, intention to change, and engagement in medical care settings (Lundahl et al., 2013). There have also been efficacy trials yielding positive effects of MI in the treatment of illicit drug use, infection risk reduction, management of chronic mental disorders, smoking, and co-morbid mental health and substance use disorders (Miller & Rose, 2009). Since evidence is mounting for MI's capacity to enhance both engagement and outcome in a range of problem areas there has been increased attention given to its use in the treatment of more serious mental health problems, particularly with the hope of increasing engagement and improving client outcome from treatment as usual.

While effective treatment may exist for psychological disorders such as eating disorders, mood, and anxiety disorders there are significant concerns surrounding the application of these treatments due to treatment refusal, adherence, and drop-out. Also, often

those clients who do complete a course of psychotherapy do not make optimal treatment gains (Westra, Aviram, & Doell, 2011). One reason that MI may be appealing as a treatment method for these disorders is that it directly addresses a significant problem common to all treatment domains, ambivalence to change (Arkowitz, Miller, & Rollnick, 2015; Arkowitz, Westra, Miller, & Rollnick, 2008). Clinical populations are often characterized by high levels of ambivalence, because while the mental health condition has a harmful impact on their quality of life, engaging in treatment to change behaviors associated with the condition is demanding and often uncomfortable. To take anxiety disorders as an example, the problem area researched in Chapters Four to Six in this thesis, individuals may be motivated for behavior change due to the limitations imposed by anxiety concerns, however engaging in treatment to change these behaviors requires the person to expose themselves to anxiety provoking situations and confront their fears (Slagle & Gray, 2007), thus causing distress. In the same vein as for problem drinkers, an MI approach incorporated into usual treatment for clinical disorders may help the client to resolve this ambivalence in preparation for working towards their behavior change goal. Another reason MI is appealing to consider for the treatment of clinical mental health conditions is that MI is a flexible approach that can be incorporated into treatment based on the specific needs of the population. For example, it may be used as a pre-treatment to increase the likelihood of treatment uptake, or adjunctive treatment alongside typical treatment methods as part of an integrative framework, or during the course of treatment if motivational problems arise or to diminish resistance (Westra et al., 2011).

Case study evidence has illustrated promising and innovative applications of MI and the flexibility of its use in the treatment of a variety of clinical problems. Such case studies have implicated the usefulness of MI in treating generalized anxiety disorder (GAD; Angus & Kagan, 2009), adolescent depression (Brody, 2009), social anxiety disorder (SAD; Buckner, 2009), and suicidal ideation (Zerler, 2009), demonstrating the capacity of MI to resolve

problems of ambivalence and increase client motivation and self-efficacy for change in a range of psychological disorders. Treatment studies have provided further support for the use of MI in these areas as both a mechanism to improve treatment engagement and also to enhance outcome. For example, eating disordered participants who received MI were more engaged in appropriate levels of treatment at follow-up (Dean, Touyz, Rieger, & Thornton, 2008) and were less likely to drop-out than treatment as usual participants (Wade, Frayne, Edwards, Robertson, & Gillchrist, 2009). In a population diagnosed with obsessive-compulsive disorder (OCD), participants who initially refused to undertake exposure and response prevention (EX/RP) to treat their OCD were randomized to either an MI or waitlist group, with 86% in the MI group accepting EX/RP treatment compared to 20% of participants agreeing in the comparison condition (Maltby & Tolin, 2005). In another OCD study, preliminary data suggested that three sessions of MI compared to three sessions of relaxation training before starting EX/RP was related to better treatment outcome (McCabe, Rowa, Antony, Young, & Swinson, 2008). Following on from preliminary evidence demonstrating the capacity of MI to enhance treatment engagement in OCD populations, one area in which MI appears to show particular promise is in the treatment of other anxiety disorders.

MI Treatment for Anxiety Disorders.

In the context of anxiety disorders, MI has been used as a tool to enhance engagement with treatment, either to improve the likelihood that participants will begin treatment or improve participants' engagement with treatment once started. For example, participants with Social Anxiety Disorder (SAD) who received MI were significantly more willing to schedule a CBT appointment over time and were more likely to attend their first appointment (Buckner & Schmidt, 2009). Similarly, participants who received MI prior to transdiagnostic CBT had higher treatment expectations and were more likely to initiate CBT treatment (Barrera, Smith, & Norton, 2015). In relation to in-session engagement, participants primarily diagnosed with Generalized Anxiety Disorder (GAD) who received MI showed greater homework

compliance (Aviram & Westra, 2011; Westra, Arkowitz, & Dozois, 2009; Westra & Dozois, 2006), and fewer resistance behaviors during CBT, with resistance mediating the effect of the MI treatment on outcome (Aviram & Westra, 2011). Apart from showing a positive effect on treatment engagement, research has also demonstrated positive effects of MI on anxiety treatment outcome. Participants with diagnoses of panic disorder, GAD, or SAD, who underwent a three-session MI pre-treatment prior to cognitive behavior therapy (CBT) showed a greater treatment response as measured by self-reported anxiety symptoms (Westra & Dozois, 2006) and, in a similar study design, those participants diagnosed with GAD showed greater symptom reduction, particularly for those participants with more severe symptoms (Westra et al., 2009). A limitation of the aforementioned treatment studies was that they did not employ control conditions. However it appears that the positive effects of MI are still apparent in the presence of an active control condition (Westra, Constantino, & Antony, 2016). Westra et al. (2016) found that participants diagnosed with GAD randomized to receive integrative MI and CBT demonstrated greater study retention and better long-term outcome on multiple dimensions including worry, anxiety, stress, and diagnostic criteria, than those participants who received CBT alone. Moreover, the MI-CBT group showed continued improvement over time with odds of being recovered more than five times greater at the 12-month follow-up point. However, not all studies have found positive results. For example, though Barrera et al. (2015) found increases in initiation and treatment expectancy, they did not find differences in treatment ambivalence or anxiety severity for the MI-CBT group. Thus, while MI has the potential to enhance traditional treatment for anxiety disorders, there is a need to understand how MI generates positive effects.

MI Mechanisms in the Treatment of Anxiety Disorders. Given the theoretical justification for using MI in clinical treatment and increasing evidence of its efficacy, research is beginning to examine the mechanisms through which MI may improve outcomes and effect change in these diverse problem areas. As described in detail in Chapter Two, therapist

behaviors and client language appear to be particularly important to the process of MI in the realms of substance use and other areas including physical activity, partner aggression, diet and exercise, and antiretroviral therapy adherence. Chapter Three expands on this research by specifically reviewing MI mechanisms of change in populations diagnosed with mood, anxiety, psychotic, and eating disorders, and patients with comorbid mental health conditions. Foreshadowing the conclusions of Chapter Three, there appeared to very little research that has examined MI processes in the context of MI treatment for clinical mental health problems, with a notable lack of research relating to therapist behaviors and client change language. However, the cumulation of evidence arising from Chapter Three and studies which have been conducted since demonstrate that MI process research has primarily been conducted with anxious participants. Furthermore, it is clear from both the review and later research that elements of MI described in the treatment of substance use are also relevant to the treatment of anxiety disorders, and most likely other areas where MI has been applied.

Qualitative research has supported the role of the therapist/client relationship in MI therapy for anxiety disorders. For example, in reflecting on their experience of MI therapy, anxious clients highlighted the empathic nature of the therapist and the safe and non-threatening environment that allowed them to open up about their anxiety concerns. Participants also reflected increased self-awareness, motivation to change their anxiety, and even reduced anxiety symptoms (Marcus, Westra, Angus, & Kagan, 2011). A further qualitative study compared post-therapy accounts of participants who had received CBT in groups either with or without an MI pre-treatment. Those participants who did receive MI described their therapists as evocative and collaborative, and described themselves as playing a more active role in therapy, working hard to solve their own problems. On the other hand, the non-MI participants described the same therapists as directive and they themselves as taking on a more passive role (Kertes, Westra, Angus, Marcus, 2011). This client perspective is consistent with the fundamental relational style emphasized in MI and highlights the impact

of MI spirit on the therapeutic experience and client participation, a factor that is critical to therapy outcome (Faris, Cavell, Fishburne, & Britton, 2009).

Empirical evidence further supports MI processes in anxious populations, with participants who received MI prior to CBT showing increases in motivation (Westra & Dozois, 2006) and less resistance during CBT than those participants who did not receive MI (Avriam & Westra, 2011). Furthermore, clients whose therapists used an MI style during moments of resistance in CBT had lower levels of post-treatment worry and subsequent resistance (Aviram, Westra, Constantino, & Antony, 2016). In the aforementioned randomized controlled trial (RCT) conducted by Westra et al. (2016), observer rated empathy and MI spirit were significantly higher in the MI-CBT condition making for an enhanced therapeutic environment in terms of collaboration and client-centeredness. Furthermore Constantino, Westra, and Antony (2015) found that better long-term outcome for the MI-CBT participants was largely accounted for by patients expressing less mid-treatment resistance and greater therapist empathy was associated with patient worry reduction. In the same RCT, clients who showed high levels of ambivalence early in treatment (as measured by CCT) had significantly better long-term outcomes and showed continued improvement over time if they received MI-CBT, whereas highly ambivalent clients who received CBT alone showed slippage of gains over time after treatment ended. On the other hand, clients with lower levels of early ambivalence seemed to have slightly better outcomes if they received CBT alone, which demonstrates the capacity of MI to enhance treatment outcome for those individuals who are highly ambivalent to change (Button, Westra, Constantino, & Antony, 2015).

It is clear from the aforementioned research that the fundamental elements of MI's proposed success in the treatment of substance use disorders, namely critical features of the client-therapist relationship and client resistance, have remained in the treatment of anxiety disorders. However, only one study has specifically examined the role of client language (Button et al., 2015), a factor that has been clearly implicated as an MI mechanism of change

in the substance use arena. Interestingly, research in the context of CBT for anxiety disorders has supported the role of client language as a possible predictor of treatment outcome in this population. For example, in a sample of adults with GAD, CCT was found to significantly predict higher post-treatment worry scores over and above self-reported levels of motivation. While positive CT was not related to client outcome, CCT also differentiated treatment responders from non-responders (Lombardi, Button, & Westra, 2014). Other studies in this context have further highlighted the capacity of CCT in particular to predict treatment engagement and outcome. For instance, greater expression of CCT has been associated with therapist/client alliance ruptures during CBT treatment (Hunter, Button, & Westra, 2014), and CCT has been associated with higher levels of resistance (opposition to the CBT therapy/therapist) early in treatment and also found to significantly predict outcome. Although the effect of CCT on outcome was non-significant when early resistance was taken into account (Button, Westra, Hara, & Aviram, 2014), the findings suggest the relevance of client language and behavior during treatment of anxiety disorders. One further study has shown that CCT in the presence of resistance consistently predicted CBT homework compliance and poorer treatment outcomes for GAD (Sijercic, Button, Westra, & Hara, 2016). The research in both MI and CBT treatment domains, therefore suggests that MI mechanisms may be important variables in the prediction of treatment outcome for anxiety disorders. Also, further examination of specific mechanisms including therapist and client behaviors, and client ambivalence could be useful. Given that research has mainly employed a population diagnosed with GAD, an examination in the context of SAD seems warranted.

MI and Social Anxiety Disorder

Given the conclusions from a review of the evidence regarding efficacy and processes of MI in the context of anxiety disorders, the focus of the empirical papers of this thesis is to test MI processes in an anxious population, namely in participants diagnosed with SAD. Social anxiety is a debilitating disorder defined as a marked and persistent fear of social or

performance situations in which embarrassment may occur (American Psychiatric Association, 2013). Epidemiological data indicate that in 2007, 4.7% of adult Australians had experienced SAD within the previous 12 months (Australian Bureau of Statistics, 2007), and worldwide SAD is one of the most prevalent mental disorders (Kessler et al., 2005). SAD is associated with functional impairment across a range of domains, including interpersonal functioning, education, occupation, and economic attainment (Grant et al., 2005; Stein & Kean, 2000) and has also been associated with high rates of suicidal ideation and suicide attempts, other mood disorders, and drug and alcohol dependence (Grant et al., 2005). While CBT has been demonstrated to be efficacious for SAD (Mayo-Wilson et al., 2014; Wersebe, Sijbrandi, & Cuijpers, 2013), not everyone benefits from treatment, with a significant minority eventually dropping out of treatment or not making optimal treatment gains. For example, Issakidis and Andrews (2004) found that 30% percent of socially anxious clients who presented for CBT treatment did not commence treatment, and a further 10% of clients dropped out once treatment had commenced. In an Australian study, 18% of those who commenced treatment dropped out after three sessions (Rapee, Gaston, & Abbott, 2009). Another problem in the realm of SAD is treatment underutilization, with many socially anxious individuals expressing a concern that if they seek treatment for their anxiety then people will know they have a mental health problem (Olfson et al., 2000). This fear aligns with a fear of public scrutiny, which is a common element of SAD (Buckner, 2009). Given the high rates of treatment disengagement and huge impact of SAD on quality of life it seems relevant to employ MI in this area, and of the preliminary research conducted in SAD populations MI interventions appear to enhance treatment initiation (Buckner & Schmidt, 2009), and motivational factors (Buckner, 2009). Therefore, the current thesis examines the process of MI in an ongoing randomized controlled trial that compares the effect of an MI style pre-treatment vs. supportive counseling prior to group CBT for SAD (Registered Clinical Trial: ACTRN12611001279910).

Overview of chapters in this thesis

The overall structure of this thesis takes the form of seven chapters, including this introductory chapter. Taken together, the chapters in the thesis aim to elucidate the mechanisms of MI in problem areas other than substance use disorders, and specifically in SAD. The review and empirical studies reported in Chapters Two to Six represent two phases of research. The first phase of the research employed a review methodology to explore MI mechanisms in MI treatment for a range of problem areas. Building on the first phase, the second phase of research aims to empirically examine purported MI mechanisms of change. Each empirical chapter represents a research article that has been published or submitted for publication, which is the standard practice when doing a thesis by publication. Thus, it is necessary that there will be some repetition from one chapter to the next.

In order to assess the state of the evidence of MI mechanism research in populations beyond substance use the second and third chapters present review articles. Chapter Two presents a systematic review of evidence for the causal chain model proposed by Miller and Rose (2009). The review draws together research that tests paths of the causal chain in varying treatment domains. Chapter Three comprises a review and meta-analysis that investigates MI mechanisms of change in populations diagnosed with mood, anxiety, psychotic, and eating disorders, and patients with comorbid mental health conditions. The final three chapters of this program of research will be dedicated to an empirical examination of MI processes in the context of SAD. The empirical papers aim to extend upon the state of MI mechanism research examined in the first two chapters. Chapter Four investigates the capacity of MI to decrease ambivalence for people with social anxiety, and examines the relationship between ambivalence and social anxiety symptom severity during a CBT treatment program and following completion of the program. Chapter Five explores therapist

and client behaviors during MI therapy for SAD. This study employs observational coding methods with an aim to examine transitions between therapist behaviors and client language during MI sessions. This study is the first step in examining evidence for MI's causal chain in the realm of social anxiety. Chapter Six aims to provide a full test of MI's causal chain. In this study, the relationship between therapist behaviors and client language will be further examined, as well as the relationship between therapist and client variables and outcome. If preliminary data permits, a full test of client change language as a mediator of treatment outcome will be examined. The advantage of these empirical studies is twofold: first, examining MI mechanisms in treatment of SAD specifically may help the development and dissemination of MI treatment programs that target and emphasize those MI processes particularly relevant to socially anxious clients. The research also extends upon the broader field of therapy process research in the treatment of anxiety disorders. As discussed previously, change language in the context of CBT has been implicated as a predictor of client outcome. Thus, investigating other MI mechanisms may play a role in informing treatment of SAD more generally and potentially contribute to better client outcome. Second, while evidence is mounting for MI treatment in a range of areas, not all research trials have shown a positive effect of MI, regardless of consistent study methodologies and MI characteristics (Magill et al., 2014). Thus, this program of research will also contribute to MI mechanism research in general, providing further insight into the process of MI and validity of the causal chain model to account for the effectiveness of MI in a range of conditions.

References

- Ajzen, I. and Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice Hall.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: American Psychiatric Association.
- Amrhein, P. C., Miller, W. R., Yahne, C. E., Palmer, M., & Fulcher, L. (2003). Client commitment language during motivational interviewing predicts drug use outcomes. *Journal of Consulting and Clinical Psychology, 71*, 862–878. doi:10.1037/0022-006X.71.5.862
- Angus L.E., & Kagan F. (2009). Therapist empathy and client anxiety reduction in motivational interviewing: “She carries with me, the experience.” *Journal of Clinical Psychology, In Session, 65*, 1156–1167. doi:10.1002/jclp.20635
- Apodaca, T. R., & Longabaugh, R. (2009). Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction, 104*, 705–715. doi:10.1111/j.1360-0443.2009.02527.x
- Arkowitz, H., Westra, H. A., Miller, W. R., & Rollnick, S. (Eds.). (2008). *Motivational interviewing in the treatment of psychological problems*. New York: Guilford Press.
- Arkowitz, H., Miller, W. R., & Rollnick, S. (Eds.). (2015). *Motivational interviewing in the treatment of psychological problems*. (2nd ed.). New York: Guilford Press.
- Austin, J. (1962). *How to do things with words*. Cambridge, MA: Harvard University Press.
- Australian Bureau of Statistics (2007). National Survey of Mental Health and Wellbeing: Summary of Results (cat. No. 4326.0). ABS, Canberra.
- Aviram, A., & Westra, H. A. (2011). The impact of motivational interviewing on resistance in cognitive behavioral therapy for generalized anxiety disorder. *Psychotherapy Research, 21*,

- Aviram, A., Westra, H. A., Constantino, M. J., & Antony, M. M. (2016). Responsive management of early resistance in cognitive-behavioral therapy for generalized anxiety disorder. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000100
- Barrera, T. L., Smith, A. H., & Norton, P. J. (2015). Motivational interviewing as an adjunct to cognitive behavioral therapy for anxiety. *Journal of Clinical Psychology*, 0, 1-10. doi: 10.1002/jclp.22239
- Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1–62). New York, NY: Academic Press.
- Bricker, J., & Tollison, S. (2011). Comparison of motivational interviewing with acceptance and commitment therapy: A conceptual and clinical review. *Behavioral and Cognitive Psychotherapy*, 39, 541–559. doi:10.1017/S1352465810000901
- Brody, A.E. (2009). Motivational interviewing with a depressed adolescent. *Journal of Clinical Psychology, In Session*, 65, 1168–1179. doi:10.1002/jclp.20636
- Buckner, J.D. (2009). Motivation enhancement therapy can increase utilization of cognitive behavioral therapy: The case of social anxiety disorder. *Journal of Clinical Psychology, In Session*, 65, 1195–1206. doi: 10.1002/jclp.20641
- Buckner, J. D., & Schmidt, N. B. (2009). A randomized pilot study of motivation enhancement therapy to increase utilization of cognitive-behavioral therapy for social anxiety. *Behavior Research and Therapy*, 47, 710–715. doi:10.1016/j. brat.2009.04.009.
- Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology*, 71, 843–861. doi:10.1037/0022-006X.71.5.843

- Button, M. L., Westra, H. A., Constantino, M. J., & Antony, M. M. (2015). *Client motivation as a moderator of treatment outcomes in MI-CBT for generalized anxiety*. In H. A. Westra and M. J. Constantino (Moderators), *An allegiance controlled RCT of MI-CBT for generalized anxiety*. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.
- Button, M. L., Westra, H. A., Hara, K. M., & Aviram, A. (2015). Disentangling the impact of resistance and ambivalence on therapy outcomes in cognitive behavioral therapy for generalized anxiety disorder. *Cognitive Behavior Therapy*. Advance online publication. doi:10.1080/16506073.2014.959038
- Constantino, M. J., Westra, H. A., & Antony M. M (2015). *Mediators of treatment effects in a randomized controlled trial testing the efficacy of augmenting CBT with motivational interviewing for severe generalized anxiety disorder*. In H. A. Westra and M. J. Constantino (Moderators), *An allegiance controlled RCT of MI-CBT for generalized anxiety*. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.
- Copeland, L., McNamara, R., Kelson, M., & Simpson, S. (2015). Mechanisms of change within motivational interviewing in relation to health behaviors outcomes: A systematic review. *Patient Education and Counseling*, 98, 401-411. doi:10.1016/j.pec.2014.11.022
- Dean, H. Y., Touyz, S. W., Rieger, E., & Thornton, C. E. (2008). Group motivational enhancement therapy as an adjunct to inpatient treatment for eating disorders: A preliminary study. *European Eating Disorders Review*, 16, 256–267. doi: 10.1002/erv.851.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self determination in human behavior*. New York, NY: Plenum.
- Faris, A. S., Cavell, T. A., Fishburne, J. W., & Britton, P. C. (2009). Examining motivational

- interviewing from a client agency perspective. *Journal of Clinical Psychology*, 65, 955-970.
doi: 10.1002/jclp.20599
- Grant, B.F., Hasin, D.S., Blanco, C., Stinson, F.S., Chou, S.P., Goldstein, R.B.,...Huang, B. (2005). The epidemiology of social anxiety disorder in the United States: Results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry*, 66, 1351–1361.
- Hettema, J., Steele, J., & Miller, W. R. (2005). Motivational interviewing. *Annual Review of Clinical Psychology*, 1, 91–111. doi:10.1146/annurev.clinpsy.1.102803.143833
- Hunter, J. A., Button, M. L., & Westra, H. A. (2014). Ambivalence and alliance ruptures in cognitive behavioral therapy for generalized anxiety. *Cognitive Behavior Therapy*, 43, 201-208. doi:10.1080/16506073.2014.899617
- Issakidis, C., & Andrews, G. (2004). Pretreatment attrition and dropout in an outpatient clinic for anxiety disorders. *Acta Psychiatrica Scandinavica*, 109, 426-433. doi: 10.1111/j.1600-0047.2004.00264.x
- Kanfer, F. H. (1986). Implications of a self-regulation model of therapy for treatment of addictive behaviors. In W. R. Miller and N. Heather (Eds.), *Treating Addictive Behaviors* (pp. 29–47). New York: Plenum Press.
- Kertes, A., Westra, H. A., Angus, L., & Marcus, M. (2011). Client experiences of cognitive behavioral therapy for generalized anxiety disorder: The impact of adding motivational interviewing. *Cognitive and Behavioral Practice*, 18, 55–69. doi:10.1016/j.cbpra.2009.06.005
- Kessler, R.C., Berglund, P., Demler, O., Jin, R., Merikangas, K.R., & Walters, E.E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 593–602.
doi:10.1001/archpsyc.62.6.593

- Lombardi, D. R., Button, M. L., Westra, H. A. (2014). Measuring motivation: Change talk and counter-change talk in cognitive behavioral therapy for generalized anxiety. *Cognitive Behavior Therapy*, 43, 12-21. doi: 10.1080/16506073.2013.846400
- Lundahl, B.W., Kunz, C., Brownell, C., Tollefson, D., & Burke, B. L. (2010). A meta-analysis of motivational interviewing: Twenty-five years of empirical studies. *Research on Social Work Practice*, 20, 137–160. doi: 10.1177//1049731509347850
- Lundahl, B., Moleni, T., Burke, B. L., Butters, R., Tollefson, D., Butler, C., & Rollnick, S. (2013). Motivational interviewing in medical care settings: A systematic review and meta-analysis of randomized controlled trials. *Patient Education and Counseling*, 93, 157 – 168. doi: 10.1016/j.pec.2013.07.012
- Magill, M., Gaume, J., Apodaca, T. R., Walthers, J., Mastroleo, N. R., Borsari, B., & Longabaugh, R. (2014). The technical hypothesis of motivational interviewing: A meta-analysis of MI's key causal model. *Journal of Consulting and Clinical Psychology*, 82, 973-983 doi: 10.1037/a0036833
- Maltby, N., & Tolin, D. F. (2005). A brief motivational intervention for treatment-refusing OCD patients. *Cognitive Behavior Therapy*, 34, 176–184. doi:10.1080/ 16506070510043741.
- Marcus, M., Westra, H. A., & Angus, L., & Kertes, A. (2011). Client experiences of motivational interviewing for generalized anxiety disorder: A qualitative analysis. *Psychotherapy Research*, 21, 447–461. doi:10.1080/10503307.2011.578265
- Martins, R. K., & McNeil, D. W. (2009). Review of motivational interviewing in promoting health behaviors. *Clinical Psychology Review*, 29, 283–293. doi:10.1016/j.cpr.2009.02.001
- Mayo-Wilson, E., Dias, S., Mavranouzouli, I., Kew, K., Clark, D. M., Ades, A. E., & Pilling, S. (2014). Psychological and pharmacological interventions for social anxiety disorder in adults: A systematic review and network meta-analysis. *Lancet Psychiatry*, 1, 368-76. doi:10.1016/

- McCabe, R. E., Rowa, K., Antony, M. M., Young, L., & Swinson, R. P. (2008). *Using motivational interviewing to augment treatment outcome with exposure and response prevention for obsessive compulsive disorder: Preliminary findings*. In H. A. Westra (Chair), Using motivational interviewing and motivational enhancement to engage individuals with cognitive behavioral therapy for anxiety. Symposium presented at the meeting of the Association for Behavioral and Cognitive Therapies, Orlando, FL.
- Miller, W. R. (1983). Motivational interviewing with problem drinkers. *Behavioral Psychotherapy, 11*, 147–172. doi:10.1017/ S0141347300006583
- Miller, W. R., Benefield, R. G., & Tonigan, J. S. (1993). Enhancing motivation for change in problem drinking: A controlled comparison of two therapist styles. *Journal of Consulting and Clinical Psychology, 61*, 455–461. doi:10.1037/ 0022-006X.61.3.455
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behavior*. New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2004). Talking oneself into change: Motivational interviewing, stages of change, and therapeutic process. *Journal of Cognitive Psychotherapy: An International Quarterly, 18*, 299–308. doi:10.1891/jcop.18.4.299.64003
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York: Guilford Press.
- Miller, W. R., & Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist, 64*, 527–537. doi:10.1037/ a0016830

Moyers, T. B. (2014). The relationship in motivational interviewing. *Psychotherapy, 51*, 358-363.

doi:10.1037/a0036910

Olfson, M., Guardino, M., Struening, E., Schneier, F.R., Hellman, F., & Klein, D.F. (2000).

Barriers to the treatment of social anxiety. *American Journal of Psychiatry, 157*, 521–527.

doi:10.1176/appi.ajp.157.4.521

Patterson, G. R., & Forgatch, M. S. (1985). Therapist behavior as a determinant for client

noncompliance: A paradox for the behavior modifier. *Journal of Consulting and Clinical*

Psychology, 53, 846-851. doi:10.1037/0022-006X.53.6.846

Rapee, R., Gaston, J., & Abbott, M. (2009). Testing the efficacy of theoretically-derived

improvements in the treatment of social phobia. *Journal of Consulting and Clinical*

Psychology, 77, 317-327. doi:10.1037/a0014800

Riper, H., Andersson, G., Hunter, S. B., de Wit, J., Berking, M., & Cuijpers, P. (2013). Treatment

of comorbid alcohol use disorders and depressions with cognitive-behavioral therapy and

motivational interviewing: a meta-analysis. *Addiction, 109*, 394-406. doi:10.1111/add.12441

Rogers, C. R. (1959). A theory of therapy, personality, and interpersonal relationships as

developed in the client-centered framework. In S. Koch (Ed.), *The Study of a Science. Vol. 3.*

Formulations of the person and the social context (pp. 184–256). New York: McGraw Hill.

Searle, J. R. (1969). *Speech Acts*. London: Cambridge University Press.

Sijercic, R., Button, M. L., Westra, H. A., & Hara, K. M. (2016). The interpersonal context of

client motivational language in cognitive-behavioral therapy. *Psychotherapy, 53*, 13 – 21. doi:

10.1037/pst0000017

Slagle, D. M., & Gray, M. J. (2007). The utility of motivational interviewing as an adjunct to

exposure therapy in the treatment of anxiety disorders. *Professional Psychology: Research*

and Practice, 38, 329–337. doi:10.1037/0735-7028.38.4.329

- Stein, M. B., & Kean, Y.M. (2000). Disability and quality of life in social phobia: Epidemiologic findings. *American Journal of Psychiatry*, 157, 1606–1613. doi:10.1176/appi.ajp.157.10.1606
- Wade, T. D., Frayne, A., Edwards, S. A., Robertson, T., & Gilchrist, P. (2009). Motivational change in an inpatient anorexia nervosa population and implications for treatment. *Australian and New Zealand Journal of Psychiatry*, 43, 235–243. doi:10.1080/00048670802653356.
- Wersebe, H., Sijbrandji, M., & Cuijpers, P. (2013). Psychological group treatments of social anxiety disorder: A meta-analysis. *PLoS One*, 8, e79034. doi: 10.1371/journal.pone.0079034
- Westra, H. A., Arkowitz, H., & Dozois, D. J. (2009). Adding a motivational interviewing pretreatment to cognitive behavioral therapy for generalized anxiety disorder: A preliminary randomized controlled trial. *Journal of Anxiety Disorders*, 23, 1106–1117. doi:10.1016/j.janxdis.2009.07.014
- Westra, H. A., & Aviram, A. (2013). Core skills in motivational interviewing. *Psychotherapy*, 50, 273-278. doi 10.1037/a0032409
- Westra, H. A., Aviram, A., & Doell, F. K. (2011). Extending motivational interviewing to the treatment of major mental health problems: Current directions and evidence. *The Canadian Journal of Psychiatry*, 56, 643–650. doi: 10.1177/070674371105601102
- Westra, H. A., Constantino, M. J., & Antony M. M (2016). Integrating motivational interviewing with cognitive-behavioral therapy for severe generalized anxiety disorder: An allegiance-controlled randomized clinical trial. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000098
- Westra, H. A., & Dozois, D. J. A. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and*

Research, 30, 481–498. doi:10.1007/s10608-006-9016-y

White, W. L., & Miller, W. R. (2007). The use of confrontation in addiction treatment: History, science, and time for change. *Counselor*, 8, 12–30.

Zerler, H. (2009). Motivational interviewing in the assessment and management of suicidality. *Journal of Clinical Psychology, In Session*, 65, 1207–1217. doi: 10.1002/jclp.20643

The following chapter presents the paper entitled “Understanding the process of motivational interviewing: A review of the relational and technical hypotheses”. This paper presents a systematic review of evidence for the causal chain model proposed by Miller and Rose (2009). The review draws together research that tests paths of the causal chain in varying treatment domains.

Chapter 2

Understanding the process of motivational interviewing: A review of the relational and technical hypotheses.

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Author contribution:

Ms. Mia Romano was solely responsible for the design of the research, data collection, analysis and write-up of this paper. Dr. Peters provided statistical and research supervision.

EMPIRICAL PAPER

Understanding the process of motivational interviewing: A review of the relational and technical hypotheses

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Abstract

Objective: The current study systematically reviews evidence for a causal chain model suggested by Miller and Rose to account for the efficacy of Motivational Interviewing (MI). **Method:** Literature searches were conducted to identify studies delivering MI in an individual format to treat various problem areas. **Results:** Thirty-seven studies met inclusion criteria. The results suggest that when clinicians utilise MI consistent behaviours, clients are more likely to express language in favour of change. Furthermore, this client language was consistently related to positive client outcome across studies. **Conclusions:** While the results support some parts of the Miller and Rose model, additional research is needed to confirm the findings in diverse populations. Understanding the mechanisms of MI's effectiveness may maximise the implementation of MI, potentially contributing to better client outcomes.

Keywords: motivational interviewing; mechanisms; change talk; therapist behaviours; behaviour change; review

Motivational Interviewing (MI) is a client-centred directive method of facilitating change that aims to enhance motivation through the exploration and resolution of ambivalence (Miller & Rollnick, 1991). MI was developed as a treatment for substance use disorders, but the application of MI has extended to the treatment of a growing list of psychological and physical health issues. Meta-analytic research provides support for the efficacy of MI in the treatment of alcohol and drug use (Lundahl & Burke, 2009), diet, exercise, diabetes (Martins & McNeil, 2009), gambling and general health-promoting behaviours (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). There is also a promising field of research supporting the efficacy of MI as an adjunctive treatment for psychiatric disorders including anxiety (Aviram & Westra, 2011; Westra, Arkowitz, & Dozois, 2009; Westra & Dozois, 2006) and eating disorders (Cassin, von Ranson, Heng, Brar, & Wojtowicz, 2008; Feld, Woodside, Kaplan, Olmsted, & Carter, 2001).

While the usefulness of MI has been supported in a variety of physical and mental health domains, it

remains uncertain as to the processes by which MI exerts its effects (Burke, Arkowitz, & Menchola, 2003). Understanding how MI contributes to positive client outcome can guide training and administration of MI, allowing MI practitioners to focus on elements that are vital to MI efficacy.

A number of social psychological and social cognitive models have been linked to MI to offer a theoretical framework for understanding its efficacy (Markland, Ryan, Tobin, & Rollnick, 2005). While theories such as Self-Determination Theory (Deci & Ryan, 1985) and Cognitive Dissonance Theory (Draycott & Dabbs, 1998) can shed light on underlying aspects of the MI process, these theories have not been empirically tested in the context of MI. There is some research that suggests that components of these theories may be relevant to MI, for example, participants assigned to MI perceived more autonomy support (a proponent of Self-Determination Theory; Foote et al., 1999) and showed enhanced self-discrepancy (a condition of cognitive dissonance; McNally, Palfai, & Kahler, 2005);

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however, such research is too rudimentary to suggest that one theory or another truly explains the efficacy of MI. Theories focusing on language processes in behaviour change, such as Speech Act Theory (Austin, 1962) and Self-Perception Theory (Bem, 1972), may be more useful in that they offer a suggestion for client's in-session behaviours that may initiate behaviour change. However, these theories do not clearly elucidate the role of therapist behaviours or the interaction between therapist and client behaviours during an MI session.

Both therapist and client behaviours are thought to be of importance to understanding the efficacy of MI. Amongst the theoretical frameworks and empirical research surrounding MI, there are two components consistently emphasised in Miller and Rollnick's MI text (1991, 2002, 2013) thought to be fundamental to the efficacy of MI. The first is a client-centred therapy style, a non-confrontational way of interacting with clients that does not force change upon them, and the second is the facilitation of client's expression of change talk (Miller & Rollnick, 1991, 2002, 2013). Miller and Rose (2009) propose two causal hypotheses (relational and technical) arising from these components that may account for the effect of MI. At present, these hypotheses appear to offer the most pragmatic account of how MI may produce change.

The relational hypothesis suggests that a therapist/client relationship that is characterised by empathy and MI spirit can evoke client behaviour change. MI spirit is an interpersonal style that emphasises client's autonomy for change, a collaborative partnership between therapist and client and evocation of the client's own motivation (Miller & Rollnick, 2013). The premise is that by engaging in this therapeutic style, the client feels in charge of the therapy process and feels safe to work through their ambivalence about change and arrive at their own choices regarding the changes they wish to make. In giving autonomy to the client, behaviour change is not forced by the therapist or others, but something the client themselves wishes for in order to achieve their own goals. This intrinsic striving for change fostered by a supportive environment and assistance from the therapist is thought to elicit actual behaviour change.

The technical hypothesis suggests that a therapist's directive and proficient use of MI-consistent (MICO) behaviour will elicit and reinforce client language in favour of change (change talk—CT), and it is this CT that is related to client outcome. Apart from a fundamental relational style that characterises interactions in MI, Miller and Rollnick (1991, 2002, 2013) also suggest specific core counselling skills that are important in resolving client's ambivalence about change. These MICO behaviours

include, but are not limited to, therapist's use of reflections and open questions, offering affirmations and support, and emphasising client control. MICO behaviours are used both to engage the client in the therapy process, for example, the use of reflections and affirmations to develop rapport and demonstrate an empathic understanding of client concerns, but are also used in a more directive sense to elicit client change language. For example, offering a reflection to clarify the client's intent to change or subtly nudging the client towards expression of commitment language. Miller and Rollnick also emphasise behaviours that are proscribed in MI, that is, MI-inconsistent (MIIN) therapist behaviour, such as confrontation, warning, and directing. MIIN behaviour is thought to impede the MI process, as it can relinquish the client's feeling of autonomy and obstruct the collaborative relationship, potentially eliciting client resistance and sustain talk (ST; arguments in favour of maintaining the status quo; Miller & Rollnick, 2013).

The technical hypothesis imparts the role of client CT as a mediator of change, that is, the therapist uses MI skills that are consistent with the principles of MI in order to elicit CT, and it is the expression of CT that is thought to be related to client behaviour change. Client CT refers to any client language which favours change; however, research by Amrhein, Miller, Yahne, Palmer, and Fulcher (2003) demonstrated that client CT could be categorised into six facets of expression: Reasons, desire, ability, need, readiness (preparatory CT categories), and commitment language. For example, an expression of desire to change may be "I really want to stop drinking," while an expression of commitment might be "I am going to stop drinking." The preparatory CT categories were suggested to be precursors to the client's expression of commitment to change. Furthermore, observation of client language in MI demonstrates that along with CT, clients also express arguments that favour the status quo (arguments against change), that is, ST. ST is thought to relate to worse client outcome because it indicates that the client may still be harbouring ambivalence for change or a lack of commitment to change. ST can also be categorised in the aforementioned fashion (Amrhein et al., 2003).

To further elaborate on the relational and technical hypotheses, Miller and Rose present a model that depicts a variety of pathways through which MI may facilitate behaviour change. Their model (presented in Figure 1) indicates that training clinicians in MI is related to therapist empathy and MI spirit, therapist use of methods that are consistent with MI, and client expression of CT and reduced resistance during MI therapy (Paths 8, 9, and 10). The model

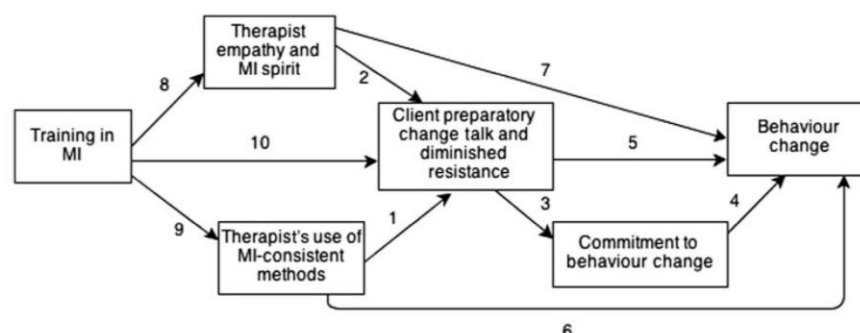


Figure 1. Causal model adapted from Miller and Rose (2009).

also suggests that both the relational and the technical attributes of MI can directly impact client behaviour change (Paths 6 and 7), or can contribute to outcomes when mediated by client CT (Paths 1 and 2 via 5). That is, both the therapeutic style of MI and the specific techniques used in MI can directly affect client treatment outcome or may facilitate client expression of CT, which in turn, is related to client outcome. Client CT and resistance (here resistance is conceptualised as ST) are hypothesised to predict client commitment to change (Path 3), which in turn affects behaviour change (Path 4). Path 3 suggests that client expression of preparatory CT language, such as statements of reasons and desire to change are related to client expression or indication of commitment to change. While Path 4 suggests that this indication of commitment is related to client behaviour change. Thus the model proposes that both preparatory CT (or a lack of ST) and commitment language specifically are related to actual behaviour change, as indicated by Path 5 and Path 4, respectively.

Though Miller and Rose's model intuitively captures the processes of MI suggested by Miller and Rollnick, whether these pathways exist in reality is understudied. There is a handful of MI process research that supports some aspects of the model, particularly the link between therapist behaviours and client CT, and the relationship between client CT and commitment to behaviour change (Miller & Rose, 2009). Meta-analytic research has also provided evidence for elements of the technical hypothesis, demonstrating a positive relationship between therapist MI consistent behaviour and client CT, and an association between client ST and worse client outcome (Magill et al., 2014). Furthermore, in a meta-analysis conducted in the substance use domain, CT was supported as a potential mediator of MI's effectiveness (Apodaca & Longabaugh, 2009). However, a review of each path of Miller and Rose's model has not yet been undertaken, and

the aforementioned reviews of MI process research were primarily conducted with substance abusing populations. Furthermore, the rapid dissemination of research in the MI field requires an up-to-date examination of potential process variables in order to offer continuous guidance to MI practice. Examining empirical evidence for each path may allow for a better understanding of the processes through which MI may affect client change, potentially providing an indication of client and therapist behaviours that are of significance to client outcome.

The aim of the current review is to systematically examine evidence for the putative model proposed by Miller and Rose. The review will appraise studies that examine any of the following relationships: The relationship between therapist style/behaviours and client CT and resistance (Paths 1 and 2), the relationship between preparatory CT and commitment to behaviour change (Path 3), and the relationship between both therapist and client behaviours and outcome (Paths 4, 5, 6, and 7).¹ The review will evaluate the validity of the relational and technical hypothesis to account for the effect of MI in a range of problem areas.

Method

Inclusion Criteria

Studies were included if they met the following criteria: (i) Participants received a therapeutic intervention referred to as "motivational interviewing," "motivational enhancement therapy (MET)," "motivational intervention" or "brief intervention" (based upon the principles of MI as defined by Miller and Rollnick (1991, 2002, 2013)); (ii) the intervention was delivered individually and in person to adult participants;² (iii) the study examined a link in Miller and Rose's (2009) causal chain (Paths 1–7); and (iv) studies were reported in English.

In order to identify MI process research that met these criteria, a variety of search methods were

employed. An electronic database search of PsycInfo, Embase, Web of Science, ProQuest Dissertations and Theses, and Google scholar was conducted using the following keywords: MI, motivational enhancement therapy, brief intervention, mechanisms of action, mediator, therapy process, change talk, and therapist behaviours. Hand-searches of the online MI bibliography (The Motivational Interviewing Network of Trainers, 1983/2012) posted on the official motivational interviewing website (<http://www.motivationalinterview.org>) were also conducted, as well as hand-searches of relevant review and meta-analytic papers (Apodaca & Longabaugh, 2009; Burke et al., 2003; Lundahl & Burke, 2009; Lundahl et al., 2010). Database searches were conducted up until March 2013.

Results

The search retrieved 384 studies of which 37 met the inclusion criteria. Figure 2 illustrates the search strategy and flow of information through different

stages of the review. The search retrieved many studies that resulted from larger RCTs. Multiple studies utilising the same sample source were included in the review if they investigated different links in the causal chain or supplied additional information about the process variable (e.g., examined CT categories as opposed to overall CT). If two studies employed identical designs and overlapping samples, either the most recent study, or the study that provided the most information about the process variable was reviewed (e.g., studies which examined the effect of each specific MICO behaviour were included over those which analysed a total MICO score by combining all therapist behaviours, Figure 2).

Path 1 (the effect of MICO on CT) and Path 6 (the effect of MICO on outcome) were the most widely examined paths. The majority of studies were conducted with alcohol users ($n = 23$). Three studies examined illicit substance abusing populations and three studies examined both alcohol and illicit substance users. Two studies were conducted with

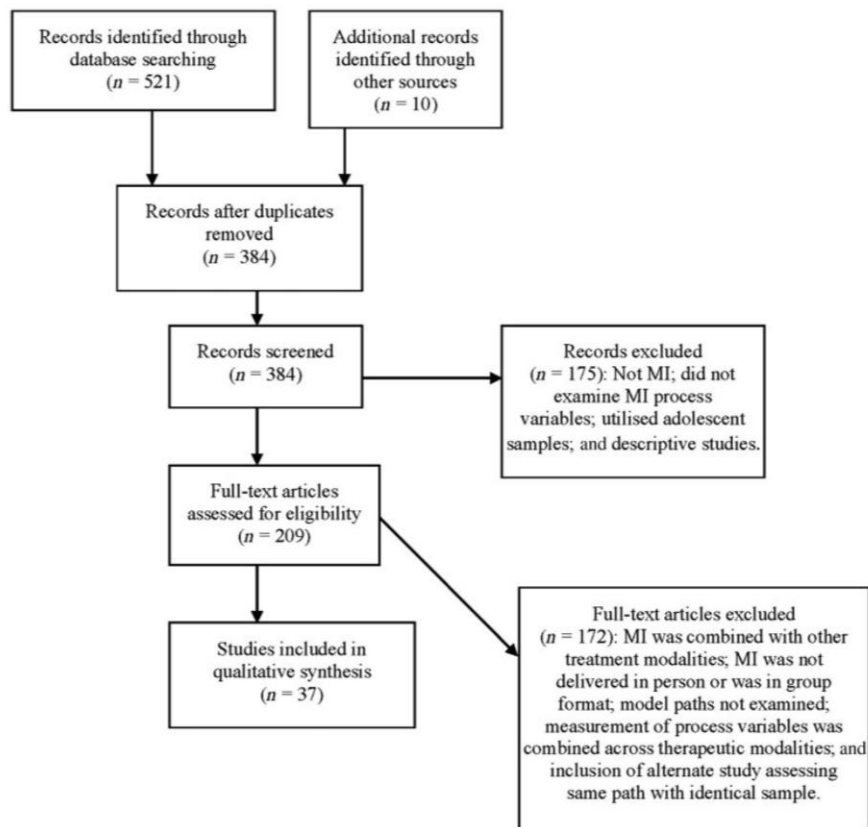


Figure 2. Flowchart of search outcomes and progression of studies through the review. Adapted from Moher, Liberati, Tetzlaff, and Altman (2009).

smokers and four in the area of health promotion, including exercise, diet, and antiretroviral therapy adherence. One study each was conducted in the areas of partner aggression and mixed mental health and substance use disorders.

The majority of studies examined elements of the model within a single MI session ($n = 32$). In eight of the 32 studies, participants received more than one session, but only one session was selected for analysis (six studies used the first session), and one study analysed the first two sessions. In five studies participants received more than one session, and all sessions were coded. Across the studies, MI session length ranged from 7 min to 90 min. Of all the 37 studies, seven studies examined a portion of the total length, generally examining 20 min of the session. Characteristics of MI for each study are presented in Table A1.

All but two studies utilised observer-rated measures of therapist and client behaviours.³ Most studies chose to examine MICO and MIIN behaviour in one of two ways: Either all specific behaviours that fell into MICO and MIIN categories were combined to create a total MICO or MIIN score; or specific behaviours were examined separately. Total MICO was generally comprised of advise with permission, affirm, emphasise control, open questions, reflect, reframe, and support. Total MIIN was comprised of advise without permission, confront, direct, raise concern without permission, and warn. Some studies also included an "other" category of behaviour that comprised of behaviours typically demonstrated in MI but not specifically MI consistent or inconsistent—facilitate, filler, giving information, and structure. In examining CT, studies combined common CT categories [desire, reasons, need, ability, taking steps,⁴ commitment, and "other" (any talk not fitting into aforementioned categories that indicates movement towards change)] to measure the effect of overall CT, or combined only preparatory categories (desire, reason, need, and ability), or examined each CT category separately. This was also the case for ST; however, total ST comprised of client language that reflected movement away from change.⁵ Across the studies, CT was mostly given strength (of the language expressed) or frequency ratings and was measured either for the session as a whole or per segment of MI.

Control conditions were often present in the larger RCT from which study data was derived; however, many of the reviewed studies did not compare therapist and client behaviours across conditions. For clarity, a comparison group is only identified if it formed part of the reviewed study and was not solely relevant to the parent study.

Study characteristics are presented alongside results for each study in Tables I–IV. Evidence for each link in the putative causal chain will now be examined.

Path 1: MI-consistent Methods → CT/Resistance

Studies that examined Path 1 provide support for a link between therapist MICO/MIIN behaviours and client CT/ST (results are presented in Table I). Particularly useful in examining this link were studies that generated transition probabilities to determine the likelihood of client CT/ST occurring following therapist behaviours. Transition probabilities describe the probability that a behaviour, such as client CT, will occur immediately after another behaviour, such as a therapist reflection, has occurred. MICO was associated with an increased probability of CT in two out of three studies (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Gaume, Gmel, Faouzi, & Daeppen, 2008) and in one study appeared to inhibit ST (Moyers, Martin, Houck, Christopher, & Tonigan, 2009). CT was significantly less likely following MIIN behaviours (Gaume et al., 2010; Gaume, Gmel, Faouzi, et al., 2008; Moyers et al., 2009), and ST was significantly more likely to follow MIIN in one study (Gaume et al., 2010). Surprisingly two studies found that MICO also led to ST (Gaume, Gmel, Faouzi, et al., 2008; Gaume et al., 2010). In considering the remaining studies, further support was achieved for Path 1. All 14 studies found some positive relationships between MICO and client CT (Apodaca, Magill, Longabaugh, Jackson, & Monti, 2013; Catley et al., 2006; Daeppen, Bertholet, Gmel, & Gaume, 2007; Fischer, 2012; Gibbons et al., 2010; Glynn & Moyers, 2010; Martino, Ball, Nich, Frankforter, & Carroll, 2008; Morgenstern et al., 2012; Moyers et al., 2009; Pirlott, Kisbu-Sakarya, Defrancesco, Elliot, & Mackinnon, 2012; Prabhu, 2008; Sargeant, 2011; Tollison, 2010; Vader, Walters, Prabhu, Houck, & Field, 2010). Across the eight studies that examined specific MICO behaviours, therapist use of reflections was most consistent and positively related to CT (Catley et al., 2006; Fischer, 2012; Gaume et al., 2010; Miller, Benefield, & Tonigan, 1993; Moyers et al., 2009; Prabhu, 2008; Tollison, 2010). CT was also sequentially related to reflections of CT (Gaume et al., 2010; Moyers et al., 2009). In general, MIIN behaviours did not share a relationship with client CT (Catley et al., 2006; Daeppen et al., 2007; Pirlott et al., 2012; Tollison, 2010), if the two were related, this relationship was negative (Apodaca et al., 2013; Gibbons et al., 2010). Overall, MIIN behaviours were also

Table 1. Study characteristics and results for Paths 1 and 2.

Study	Target problem	n	Process measure	Comparison condition	Path examined	Results
Gaume et al. (2010)	Alcohol	149	MISC	None	1	MICO and also simple and complex reflections individually were significantly more likely to be followed by CT and ST. MIIN was significantly more likely to be followed by ST and significantly less likely to be followed by CT.
Gaume, Gmel, Faouzi, et al. (2008)	Alcohol	97	MISC	None	1	MICO was significantly more likely to be followed by CT/ST. MIIN was significantly less likely to be followed by CT.
Gibbons et al. (2010)	Alcohol/Illicit substances	377	ITRS ^a	Counselling as usual	1	Therapist's adherence and competence in fundamental and advanced MI skills were associated with more CT and less resistance to change. MIIN was negatively associated with increases in CT.
Glynn and Moyers (2010)	Alcohol	47	MISC	Functional Analysis	1	Clients expressed significantly more CT when therapists employed techniques to evoke CT (e.g., evocative questions, reflections, and exploring goals and values) compared to functional analysis (therapists discussed the function of drinking for clients).
Martino et al. (2008)	Alcohol/Illicit substances ^b	461	ITRS ^a /Idiosyncratic CT scale	Counselling as usual	1	Fundamental and advanced MI adherence and competence were related to more CT and less resistance at end treatment.
Moyers et al. (2009)	Alcohol	63	SCOPE	None	1	MICO was a significant positive predictor of CT/ST. MIIN did not predict CT but positively predicted ST. CT was more likely than expected by chance following QPOS, QNEG, and RCT, and less likely following MIIN, RST, REF, and "other" behaviours. ST was likely to follow QPOS, QNEG, and RST but not likely to follow MICO or "other."
Sargeant (2011)	Dual diagnoses ^c	45	MISC/DARN-C	None	1	MICO was positively related to reasons CT frequency but was not related to desire, ability, or commitment language.
Vader et al. (2010)	Alcohol	143	MISC	MI + FB	1	When controlling for client's talkativeness, MICO was positively correlated with CT in the MI + FB condition and CT and ST in the MI only condition.
Apodaca et al. (2013)	Alcohol	157	MISC	None	1, 2	At decile level, MICO/MIIN did not predict CT or ST. At session level, MICO positively predicted CT and MIIN negatively predicted CT. At decile level, MI spirit and acceptance were unrelated to CT, but did relate to reduced ST.
Daepgen et al. (2007)	Alcohol	97	MISC	None	1, 2	Frequency but not % MICO was related to client's intention to decrease alcohol use following MI. MIIN, the ratio of reflections to questions, % open questions, and % complex reflections were unrelated to intention to decrease alcohol as were acceptance, empathy, and MI spirit.
Catley et al. (2006)	Smoking	86	MISC	None	1, 2	MICO positively related to CT (need, desire, intention, and optimism for change) but was unrelated to ST (i.e., arguing, interrupting, negating, and not following). MIIN was unrelated to CT/ST. Individually, reflect, reframe, and raise concern without permission positively related to CT (open questions related at trend level). Advise without permission negatively related to CT (warm negatively related at trend level). Advise with permission, emphasise control, support, confront, and direct were unrelated to CT. Emphasise control was negatively related to ST, and reframe was positively related to ST. No other specific behaviour was related to ST. Acceptance, egalitarianism, warmth, genuineness, empathy, and MI spirit averaged together positively predicted CT, but not ST.
Fischer (2012)	Alcohol/Illicit substances	150	MISC/ISCEE	None	1, 2	MICO and RCT were significantly positively related to CT. Reflect ST positively related to ST. The frequency but not duration of empathic speech was related to CT, but both measures of empathic speech showed larger positive correlations with ST.

Table I (Continued)

Study	Target problem	n	Process measure	Comparison condition	Path examined	Results
Priort et al. (2012) Prabhu (2008)	Health Promotion	43	MISC	None	1, 2	MICO correlated positively with CT but had no relationship with ST. MIIN was unrelated to CT/ST. MI spirit, empathy, and direction were positively related to CT but were unrelated to ST.
	Alcohol	30	MISC	MI + FB	1, 2	MICO positively predicted CT, and MIIN positively predicted ST in MI + FB. Facilitate was positively related to CT in MI + FB and ST in both conditions. Simple reflections were positively related to CT in MI + FB and positively related to ST in both conditions. Complex reflections were positively related to CT in MI + FB. Total reflections were positively related to CT in MI + FB and positively related to ST in both conditions. The ratio of reflections to questions was positively related to CT/ST in MI + FB. % MICO was negatively related to ST in the MI+FB condition. Advise without permission was positively related to ST in MI + FB. Advise with permission, affirm, filler, giving information, open and closed questions, raise concern with permission, reframe, structure, support, confront, and direct were not related to CT/ST. Acceptance and empathy were positively related to CT in both conditions. MI spirit was positively related to CT in MI + FB. Acceptance, empathy, and MI spirit were not related to ST.
Tollison (2010)	Alcohol	97	MI-PACT	None	1, 2	Therapist and client speech was divided into deciles. MICO was positively related to preparatory CT frequency in the concurrent but not subsequent decile. Frequency of open questions did not relate to CT in the same decile but predicted less CT in the subsequent decile. RCT positively predicted CT in the same decile but not the subsequent decile. RST positively predicted ST in the concurrent but not subsequent decile. MIIN was unrelated to ST. Over the entire session, simple and complex reflections did not relate to CT. When analysed with MICO, empathy was unrelated to CT frequency. When the use of open questions and RCT was low, empathy positively predicted CT (same decile). Empathy positively predicted CT in the subsequent decile when RCT was high. Positive correlations were found between therapist confront and client argue, off-task, interrupt, and deny problems ($r = .74-.88$). Positive associations between therapist teach and client follow, therapist restructure and client acknowledging problems, and therapist listening and client following and acknowledging problems ($r = .74-.94$). Participants' allocated to the client-centred therapy style showed greater CT and less resistance than those who received directive confrontational counselling (these clients were more likely to deny problems, argue with, interrupt and ignore the therapist, and less likely to acknowledge problems).
Miller et al. (1993)	Alcohol	42	Modified CRC	Directive Confrontational Counselling	1, 2	MI (MI spirit + Directive elements) predicted significantly greater commitment language than SOMI.
Morgenstern et al. (2012)	Alcohol	89	MITI/CLCS	SOMI/Self-change	2	

MISC = Motivational Interviewing Skill Code; ITRS = Independent Tape Rating Scale; SCOPE = Sequential Code for Observing Process Exchanges; DARN-C = Desire, Ability, Reasons, Need and Commitment; A Training Manual for Coding Client Commitment; ISCEH = In-Session Coding of Empathic Expressions; MI-PACT = Motivational Interviewing Process Assessment and Change Talk coding scheme (A modified version of the MISC, CLCS and MITI); CRC = Client Resistance Code; MITI = Motivational Interviewing Treatment Integrity Code; CLCS, Client Language Coding System (Amrhein et al., 2003); FB = Feedback; SOMI = Spirit-Only MI; MICO = MI Consistent behaviours; MIIN = MI Inconsistent behaviours; CT = Change Talk; ST = Sustain Talk; QPOS = Question Positive Aspects of the Target behaviour; QNEG = Question Negative Aspects of the Target Behaviour; RCT = Reflect Change Talk; RST = Reflect Sustain Talk; REF = Reflect both CT/ST and neutral language.

^aFundamental MI skills: Open questions, reflections, affirmations, collaboration, and a MI style; Advanced skills: client-centred problem discussion and feedback, pros and cons, resolving ambivalence, heightening discrepancies and motivation for change, and change planning; MIIN behaviours: emphasis on abstinence, powerlessness and loss of control, unsolicited advice or direction giving, confrontation of denial/defensiveness, therapeutic authority, and use of practices from other therapies.

^bIllicit substances included cocaine, marijuana, opiates, methamphetamines, and "other."

^cParticipants had co-occurring diagnoses of substance use disorder (opiates, cocaine, and cannabis) and either schizophrenia, schizoaffective disorder, major depression, bipolar disorder, or other psychotic disorder.

unrelated to ST. However, one study did find that more use of MIIN behaviour by the therapist related to increased ST (Prabhu, 2008), and one found that therapist confrontation was strongly positively correlated with other client-resistance behaviours, such as arguing and denying problems (Miller et al., 1993).

Path 2: Therapist Empathy/MI Spirit → CT/Diminished Resistance

Overall, the results of the included studies provide variable support for a relationship between therapist MI spirit/empathy and client CT. Results for this path are presented in Table I. Two studies had results consistent with the model, showing that both MI spirit and empathy were significantly positively correlated with client CT (Pirlott et al., 2012; Prabhu, 2008). One study showed the opposite; levels of acceptance, empathy, and MI spirit did not differ between clients who either intended to decrease alcohol use or not after an MI intervention (Daeppen et al., 2007). The relationship between MI spirit/empathy and CT among the remaining studies was more variable, showing inconsistencies that may be related to construct measurement (e.g., Tollison (2010) found that the relationship between empathy and CT differed depending on the rate of open questions and reflections of CT offered by the therapist). Two studies provided support for the role of an overall MI spirit and empathic style in eliciting CT and reducing resistance (Miller et al., 1993; Morgenstern et al., 2012).

Path 3: Client CT/Diminished Resistance → Commitment to Behaviour Change

Data for Path 3 (examining the link between client preparatory CT and commitment to change) can be seen in Table II. Results showed that taking steps CT and preparatory language categories (desire, reasons, need, and ability) shared some significant relationships with client commitment language (Amrhein et al., 2003; Martin, Christopher, Houck, & Moyers, 2011; Sargeant, 2011; Tollison, 2010) and were related to client intention to decrease alcohol use (Daeppen et al., 2007). CT was also related to client completion of a change plan (Magill, Apodaca, Barnett, & Monti, 2010).

Path 4: Client Commitment to Behaviour Change → Behaviour Change

The relationship between commitment to behaviour change and actual behaviour change was examined in 12 studies (results are presented in Table III). Half of these studies provided support for a positive

relationship between commitment to change and outcome measures (Amrhein et al., 2003; Campbell, Adamson, & Carter, 2010; Daeppen et al., 2007; Morgenstern et al., 2012; Peterson, 2011; Tollison, 2010). Of the six studies though, one study found that the relationship between commitment and reduced alcohol use was at trend-level only (Morgenstern et al., 2012), and one found that commitment language at 2 of the 10 time points assessed during MI was related to fewer alcohol problems at follow-up but no other outcome variable (Tollison, 2010). Peterson (2011) also found that the relationship between commitment language and outcome depended on assessment period and how commitment language was measured. The remaining six studies did not support a link between commitment language and positive client outcome (Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2012; Gaume, Gmel, & Daeppen, 2008; Martin et al., 2011; Perry & Butterworth, 2011; Sargeant, 2011; Walker, Stephens, Rowland, & Roffman, 2011).

Path 5: Client CT/Diminished Resistance → Behaviour Change

Overall, the studies provide support for the link between client CT and behaviour change (shown in Table III). In evaluating the effect of combined CT categories, five out of seven studies demonstrated that positive client CT was related to better client outcomes at end treatment or follow-up assessments, including reduced drinking (Bertholet, Faouzi, Gmel, Gaume, & Daeppen, 2010; Miller et al., 1993; Moyers et al., 2009), increased fruit and vegetable intake (Pirlott et al., 2012), and the amount of antiretroviral medication taken (Peterson, 2011). One study showed no difference in the frequency of CT for remitted and unremitted drinkers but found remitted drinkers to have engaged in less ST during MI (Campbell et al., 2010). Eight studies examined CT categories, seven of which demonstrated that one or more of the individual categories were related to client behaviour change (Campbell et al., 2010; Gaume et al., 2012; Gaume, Gmel, & Daeppen, 2008; Martin et al., 2011; Sargeant, 2011; Strang & McCambridge, 2004; Walker et al., 2011). However the study of Amrhein et al. (2003) found that the preparatory CT categories (desire, reason, need, and ability) were not reliable predictors of outcome relative to client commitment language. As a category, ability CT was the most consistent predictor of client behavioural changes, with six of the seven studies that analysed ability CT supporting a significant relationship to client outcome (Campbell et al., 2010; Gaume et al., 2012; Gaume, Gmel, & Daeppen,

Table II. Study characteristics and results for Path 3.

Study	Target problem	<i>n</i>	Process measure	Path examined	Results
Amrhein et al. (2003)	Illicit substances ^a	84	CLCS	3	The strength of each preparatory language category uniquely predicted commitment language strength.
Daeppen et al. (2007)	Alcohol	97	MISC	3	Participants who intended to decrease alcohol use uttered significantly higher frequencies of desire, reasons, need, and commitment CT but not ability or taking steps CT.
Magill et al. (2010)	Alcohol	291	MISC	3	CT was a positive predictor of change plan completion, and ST was a negative predictor in a model including seven demographic and treatment-related covariates and therapist behaviours. Positive commitment, ability, and desire were positive predictors in the final model, and negative reasons CT was a negative predictor of change plan completion.
Martin et al. (2011)	Alcohol	118	SCOPE	3	Ability (+ and -), reasons (+), need (+), and "other" (+) CT were positively related to commitment language (+). Desire (+ and -), taking steps (+ and -), reasons (-), and need (-) were not related to commitment language. Reasons (+ and -), desire (-), ability (-), need (-), and "other" (+) were positively related to negative commitment [taking steps (-) was unrelated]. Positive desire, ability, need, and taking steps were not related to negative commitment.
Sargeant (2011)	Dual diagnoses ^b	45	MISC/ DARN-C	3	Desire, ability, and reasons language frequency positively related to commitment language. Reasons and ability accounted for unique variance in commitment language.
Tollison (2010)	Alcohol	97	MI-PACT	3	Strength of preparatory CT was associated with an increased likelihood of commitment language occurring in the concurrent decile, and a trend was reached for the subsequent decile. CT was not related to counter-commitment language in either decile.

Note. No Path 3 studies utilised a comparison condition.

CLCS = Client Language Coding System (Amrhein et al., 2003); MISC = Motivational Interviewing Skill Code; SCOPE = Sequential Code for Observing Process Exchanges; DARN-C = Desire, Ability, Reasons, Need and Commitment; A Training Manual for Coding Client Commitment; MI-PACT = Motivational Interviewing Process Assessment and Change Talk coding scheme (A modified version of the MISC, CLCS and MITI); CT = Change Talk.

^aIllicit substances included cocaine, crack, heroin, "other"; methamphetamines, speed, crank, marijuana, Percocet, Xanax, and codeine.

^bParticipants had co-occurring diagnoses of substance use disorder (opiates, cocaine, and cannabis) and either schizophrenia, schizoaffective disorder, major depression, bipolar disorder, or other psychotic disorder.

2008; Martin et al., 2011; Sargeant, 2011; Walker et al., 2011). In four of these studies, ability CT was a significant predictor of outcome after controlling for multiple predictor variables, including other CT categories (Campbell et al., 2010; Gaume, Gmel, & Daeppen, 2008; Martin et al., 2011; Sargeant, 2011). One study examined general client resistance behaviours (a combination of ST and other behaviours thought to impede the change process) and found that clients who showed increased resistance had worse outcomes (Miller et al., 1993).

Path 6: Therapist Use of MI Consistent Methods → Behaviour Change

The results for Path 6 (the link between therapist behaviours and client behaviour change) are presented in Table IV. When MICO behaviours (e.g., use of reflections, open questions, affirmations, advising with permission, and support) were combined to predict outcome, one out of four studies demonstrated a positive relationship, and specifically, greater use of MICO was associated with fewer drinks per week at follow-up (Moyers et al., 2009).

Two studies examined overall adherence to the principles of MI, both showing that adherence to and competence in executing fundamental and advanced MI skills were positively related to the amount of negative drug screens achieved by the client (Gibbons et al., 2010; Martino et al., 2008). In examining the presence of MI's directive elements, Morgenstern et al. (2012) showed that the combination of directive elements (e.g., giving feedback, working on a change plan, and eliciting CT) with MI spirit and empathy did not reduce drinking more than an MI spirit-only condition. Overall, the relationship between specific therapist behaviours and outcome was varied. Some behaviours were consistently related to outcome across studies, while others were not. Only Gaume, Gmel, and Daeppen (2008) presented results for each MICO behaviour (significant or not), demonstrating that just 2 out of 13 therapist behaviours (advising with permission and affirming statements) were associated with decreases in heavy drinking episodes (Gaume, Gmel, & Daeppen, 2008). Predictors of positive outcome included a higher ratio of reflections to questions (2/2 studies; Thrasher et al., 2006;

Table III. Study characteristics and results for Paths 4 and 5.

Study	Target problem	<i>n</i>	Process measure	Comparison condition	Path examined	Results
Daepfen et al. (2007)	Alcohol	97	MISC	None	4	Clients who intended to decrease alcohol use at BMI completion had significantly greater reductions in weekly drinking, heavy drinking episodes, and AUDIT scores from baseline to FU than clients who did not intend to decrease their drinking.
Morgenstern et al. (2012)	Alcohol	89	MITI/CLCS	SOMI/Self-change condition	4	Week 1: Greater commitment CT predicted reduced drinking at trend level. Commitment CT mediated the relationship between condition differences and outcome. Week 2: Commitment CT was unrelated to outcome. No mediation present.
Perry and Butterworth (2011)	Exercise	20	CLCS	Advice only	4	Commitment strength was unrelated to physical activity. Trend towards more physical activity in those with stronger commitment language.
Tollison (2010)	Alcohol	97	MI-PACT	None	4	Controlling for baseline drinks per week, strength of commitment/counter-commitment language per decile and at-session level was not predictive of drinking. Commitment at decile 10 was marginally negatively related to drinks per week. Commitment at decile 4 and 10 was predictive of fewer alcohol-related problems at FU; however, commitment/counter-commitment strength for the whole session was not.
Amrhein et al. (2003)	Illicit substances ^a	84	CLCS	None	4, 5	Strength of commitment language towards the end of MI predicted client abstinence the subsequent year (over and above alcohol use at intake). A positive slope of commitment language strength over the course of MI also predicted maintained abstinence. Preparatory CT categories were not reliable predictors of behaviour change.
Campbell et al. (2010)	Alcohol	28	MISC—modified	None	4, 5	Remitted drinkers showed significantly higher commitment strength in Session 2 and change in commitment during MET significantly predicted outcome in the regression model. Remitted drinkers uttered significantly less ST per interval of MET and had higher ability strength than unremitted drinkers in the last MET interval. As predictors of outcome, a forward regression indicated that ability strength was the most significant single predictor. Ability strength and average ST remained significant predictors in a backward regression model.
Gaume et al. (2012)	Alcohol	127	MISC	None	4, 5	Clients showed 15% more drinking with each utterance of positive commitment language (with a strength of +1). Commitment language remained a significant negative predictor in the multivariate model (including negative desire, and need, and positive ability). CT/ST were unrelated to changes in drinking at 6-month FU. The frequency of positive ability/desire/need CT grouped together significantly predicted better outcome, while negative ability/desire/need predicted poor outcome. The average strength of ability/desire/need was strongly related to better outcome, as was the average strength of taking steps. In final frequency and strength models, taking steps was excluded. Individually, frequency of desire (–) and need (–) and ability (+) were significant and robust predictors of change (need (+) and taking steps (+) were excluded).
Gaume, Gmel, and Daepfen (2008)	Alcohol	97	MISC	None	4, 5	Commitment language was not related to weekly alcohol use or number of heavy drinking episodes, nor was desire, reason, or need CT. Averaged strength of ability CT (+5 to –5) predicted decreases in weekly alcohol use (controlling for age, sex, and AUDIT score). Ability and taking steps were associated with fewer heavy drinking episodes, but neither category predicted outcome when controlling for AUDIT score, age, and sex.
Martin et al. (2011) ^b	Alcohol	118	SCOPE	None	4, 5	Client language was factor analysed, creating five factors: ST, taking steps, preparatory language, commitment, and ability. All factors were included in regression models to predict DDD and PDA. The commitment factor did not predict any outcome variable. No factor predicted DDD. Taking steps was a significant predictor of proximal PDA. Preparatory language positively predicted Distal PDA and ability was a negative predictor.

Table III (Continued)

Study	Target problem	n	Process measure	Comparison condition	Path examined	Results
Peterson (2011)	ART adherence	98	MISC	Standard care/Enhanced counselling + observed therapy	4, 5	Relationships between preparatory CT/ST and commitment/counter-commitment language with ART adherence were assessed at weeks 1, 2, and 12. Week 1: Commitment strength was positively related to % of ART medication taken on time and change in commitment throughout MI was positively related to the % of medication taken. Week 2: No significant relationships. Week 12: Preparatory CT was positively related to % taken, and commitment strength was positively related to % of medication taken and % taken on time.
Sargeant (2011)	Dual diagnoses ^e	45	MISC/ DARN-C	Counselling as usual	4, 5	Frequencies of desire, ability, need, and commitment language were entered as predictors of short and long-term treatment attendance and substance use. Ability uniquely predicted long-term treatment attendance above and beyond depressive and negative symptoms and substance use severity, and approached significance as a unique predictor of long-term substance use. Strength of ability and reasons language were also examined. Ability strength approached significance in predicting short-term attendance and uniquely predicted short-term substance use. Reasons strength approached significance in predicting long-term treatment attendance and long-term substance use.
Walker et al. (2011)	Marijuana	61	CLCS	None	4, 5	CT categories were measured three times during MI (pre-PFR, PFR, and post-PFR) and relationship to outcome assessed at 4-, 16-, and 34-month FU. Commitment and need language were not related to clients' PDA at any FU. Ability (PFR and post-PFR) was positively related to PDA at 16 months. Desire (PFR) was positively related to PDA at all FU points. Reasons CT (Pre-PFR) was positively related to PDA at all FU points. Reasons CT (PFR) was positively related at 4 and 16 months. Controlling for baseline marijuana use, all categories combined explained additional variance in PDA with desire and reason strength contributing unique effects.
Bertholet et al. (2010)	Alcohol	97	MISC	None	5	CT categories were combined to indicate the direction of CT overall. Clients with an inclination towards change at the end of MI drank significantly fewer drinks per week than clients with an away from change last state (controlling for baseline alcohol consumption). Client interrupting, arguing, off-task responses (i.e., inattention, silence, or sidetracking) and negative responses (i.e., blaming others, disagreeing, pessimism, expressed reluctance, or unwillingness to change) negatively predicted 12-month alcohol consumption, but did not predict outcome at 6-week FU.
Moyers et al. (2009)	Alcohol	63	SCOPE	None	5	6 weekly measures of client drinking were collected from baseline to Week 5. CT predicted fewer drinks per week at Week 5 and the slope of drinking from baseline to Week 5.
Pirlott et al. (2012)	Health promotion	43	MISC	None	5	Total positive client CT correlated positively with fruit/vegetable intake. No relationship between ST and outcome. CT mediated the effect of clinician behaviours on outcome.
Strang and McCambridge (2004)	Marijuana	44	Idiosyncratic measure	None	5	Only action-oriented CT (CT relating to a need to change) predicted cannabis use at 3-month FU (risk awareness, problem recognition, concern, and optimism about change did not).

ART = Antiretroviral therapy; MISC = Motivational Interviewing Skill Code; MITI = Motivational Interviewing Treatment Integrity Code; CLCS = Client Language Coding System (Amrhein et al., 2003); MI-PACT = Motivational Interviewing Process Assessment and Change Talk coding scheme (A modified version of the MISC, CLCS and MITI); SCOPE = Sequential Code for Observing Process Exchanges; DARN-C = Desire, Ability, Reasons, Need and Commitment; A Training Manual for Coding Client Commitment; CRC; Client Resistance Code; SOMI = Spirit-Only MI; BMI = Brief Motivational Interviewing; AUDIT = Alcohol Use Disorders Identification Test; FU = Follow-up; CT = Change Talk; ST = Sustain Talk; MET = Motivational Enhancement Therapy; DDD = Drinks per drinking day; PDA = Percent Days Abstinent; PFR = Personalised Feedback Report.

^aIllicit substances included cocaine, crack, heroin, "other"; methamphetamines, speed, crack, marijuana, Percocet, Xanax, and codeine.

^bThis study utilised the same sample as Moyers et al. (2009); it was included in the review as it examined CT categories.

^cParticipants had co-occurring diagnoses of substance-use disorder (opiates, cocaine, and cannabis) and other schizophrenia, schizoaffective disorder, major depression, bipolar disorder, or other psychotic disorder.

Table IV. Study characteristics and results for Paths 6 and 7.

Study	Target Problem	n	Process measure	Comparison condition	Path examined	Results
Gibbons et al. (2010)	Alcohol/Illicit substances	377	ITRS ^a	Counselling as usual	6	Fundamental and advanced MI adherence and competence were positively associated with % of negative drug screens obtained during 4 weeks of treatment. MIIN was negatively associated with % negative drug screens.
Karno and Longabaugh (2005)	Alcohol	141	Therapy Process Rating Scale Directiveness Subscale	CBT + TSF	6	For participants high in reactance, increased therapist directiveness was associated with less PDA and more DDD post-treatment (largest effect observed in MET). Therapist directiveness did not predict PDA for low reactance participants. 5/6 directiveness items were significant in predicting PDA: Frequency of closed-ended questions, interpretations, confrontation, interpreting resistance, and introducing topics. For DDD, therapist interpretation, confrontation, and introduction of topics were significant. Providing information did not predict PDA or DDD
Martino et al. (2008)	Alcohol/Illicit substances ^b	461	ITRS*/Idiosyncratic CT Scale	Counselling as usual	6	Fundamental and advanced MI adherence and competence were positively associated with % of negative drug screens obtained during 4 weeks of treatment. MIIN was negatively associated with % negative drug screens.
Moyers et al. (2009)	Alcohol	63	SCOPE	None	6	A higher frequency of MICO predicted fewer drinks per week at Week 5 of the study and predicted the slope of drinking from baseline through Week 5.
Sargeant (2011)	Dual diagnoses ^c	45	MISC/DARN-C	None	6	MICO behaviours did not predict outcome.
Strang and McCambridge (2004)	Marijuana	44	Idiosyncratic instrument	None	6	Therapist self-rated directiveness predicted reductions in marijuana use at 3 months.
Tollison et al. (2008)	Alcohol	67	MITI	None	6	Greater use of simple reflections was significantly related to more drinks per week at follow-up (open and closed questions and complex reflections were unrelated to outcome).
Magill et al. (2012)	Alcohol	577	Idiosyncratic MET Clinical Emphasis measure	None	6	Therapist's focus on client ambivalence (focus on ambivalence, rolling with resistance, and developing discrepancy) predicted more DDD in the outpatient sample, but was unrelated to outcome in the aftercare sample. Therapist's focus on commitment (eliciting CT, encouraging steps towards change, and discussing commitment to abstinence) was associated with greater PDA and reduced DDD in both samples. Therapist's expression of empathy and support of self-efficacy were excluded due to non-significance.
Baird et al. (2007)	Alcohol	210	Idiosyncratic Intervention Implementation Measure	None	6, 7	Less focus on drinking (therapist increases ambivalence about drinking, provides feedback, elicits CT, encourages client's commitment to change) and greater focus on emotional support (therapist expressed empathy, supported self-efficacy, and emphasised personal responsibility for change) predicted participant attendance at the second MI session.
Gaume, Gmel, and Daerppen (2008)	Alcohol	97	MISC	None	6, 7	Advise with permission and affirm related to fewer heavy drinking episodes. Confront was negatively related to change in heavy drinking episodes, which approached significance. Advise without permission, emphasise control, giving information, open and closed questions, simple and complex reflections, support, structure, and warning were not related to either outcome variable. In multiple regression models, no therapist behaviour was a significant predictor, affirming behaviours approached significance to predict heavy drinking episodes. Empathy was associated with greater weekly alcohol decrease and fewer heavy drinking episodes (MI spirit and acceptance were unrelated).

Table IV (Continued)

Study	Target Problem	n	Process measure	Comparison condition	Path examined	Results
Miller et al. (1993)	Alcohol	42	Modification of CRC	Directive confrontational counselling	6, 7	Confrontation (challenging, disagreeing, head on disputes, incredulity, emphasising negative client characteristics, and sarcasm) predicted worse outcomes 1 year later. Other behaviours (direct, listen, query, restructure, support, teach, and understand) were not related to outcome. No differences in outcome were found between client-centred and directive approaches.
Morgenstern et al. (2012)	Alcohol	89	MITI/CLCS	SOMI/Self-change condition	6, 7	MI (MI spirit + Directive elements) achieved no better drinking outcomes than the SOMI or self-change conditions. SOMI had larger reductions in drinking, though the difference was non-significant.
Pirlott et al. (2012)	Health promotion	43	MISC	None	6, 7	MICO was unrelated to fruit/vegetable intake. MIIN showed a marginal positive correlation. Direction, MI spirit, and empathy were not related to outcome.
Thrasher et al. (2006)	ART adherence	47	MISC	None	6, 7	Higher ART adherence was positively related to affirm, a higher ratio of reflections to questions, and negatively related to closed questions. Acceptance, egalitarianism, empathy, genuineness, warmth, and MI spirit averaged together, and acceptance and empathy individually were positively associated with ART adherence but only for participants who discussed medication-related topics.
Tollison et al. (2013)	Alcohol	327	MITI	None	6, 7	Open questions and simple reflections were correlated with an increased number of drinks per week at 5- and 10-month follow-up. Closed questions, complex reflections, empathy, and MI spirit were unrelated to outcome. More open questions during MI predicted a greater increase in drinking over time for the heaviest drinkers. More simple reflections also predicted significantly more drinking over time, but baseline drinking did not moderate this effect.
Woodin et al. (2012)	Partner aggression	25	MITI	None	6, 7	A higher reflection to question ratio was related to greater aggression reductions for men and women. A higher % of open questions was related to reductions in women but not men. % Complex reflections and % MICO were unrelated to outcome. Empathy was related to marginally greater aggression reductions for women but not men. MI spirit was unrelated to outcome.
Feldstein and Forchimes (2007)	Alcohol	51	MITI	No treatment control	7	Therapist empathy was not related to binge drinking and alcohol-related problems at follow-up for the 35 MI clients.
Thyrian et al. (2007)	Smoking	161	MITI	None	7	Based on empathy and MI spirit ratings, MI sessions were divided into "good" and "low/moderate" adherence categories. "Good" adherence to the principles of MI significantly raised the chances of being a non-smoker after 6 months.

ITRS = Independent Tape Rating Scale; SCOPE = Sequential Code for Observing Process Exchanges; MISC = Motivational Interviewing Skill Code; DARN-C = Desire, Ability, Reasons, Need and Commitment; A Training Manual for Coding Client Commitment; MITI = Motivational Interviewing Treatment Integrity Code; CRC = Client Resistance Code; CLCS = Client Language Coding System (Amrhein et al., 2003); CT = Change Talk; MICO = MI Consistent behaviours; MIIN = MI Inconsistent behaviours; MET = Motivational Enhancement Therapy; CBT = Cognitive Behaviour Therapy; TSF = Twelve-Step Facilitation Therapy; SOMI = Spirit-Only MI; PDA = Percent Days Abstinent; DDD = Number of drinks per drinking day; ART = Antiretroviral Therapy.

^aFundamental MI skills: Open questions, reflections, affirmations, collaboration, and a MI style; Advanced skills: client-centred problem discussion and feedback, pros and cons, resolving ambivalence, heightening discrepancies and motivation for change, and change planning; MIIN behaviours: emphasis on abstinence, powerlessness and loss of control, unsolicited advice or direction giving, confrontation of denial/defensiveness, therapeutic authority, and use of practices from other therapies.

^bIllicit substances included cocaine, marijuana, opiates, methamphetamines, and "other."

^cParticipants had co-occurring diagnoses of substance use disorder (opiates, cocaine, and cannabis) and either schizophrenia, schizoaffective disorder, major depression, bipolar disorder, or other psychotic disorder.

Woodin, Sotskova, & O'Leary, 2012), the number of affirming statements (2/2 studies; Thrasher et al., 2006; Gaume, Gmel, & Daeppen, 2008), advising with permission (examined in one study; Gaume, Gmel, & Daeppen, 2008), and therapist focus on client commitment (examined in one study; Magill, Stout, & Apodaca, 2012). Therapist use of complex reflections was not related to outcome in the four studies that examined it, and the use of open questions showed one negative relationship to outcome (Tollison et al., 2013) and one positive relationship but only for women in the sample (Woodin et al., 2012). With respect to negative predictors, at 1-year follow-up, therapist use of confrontation predicted worse drinking outcomes in two out of three studies (Karno & Longabaugh, 2005; Miller et al., 1993), with a trend emerging in the third study (Gaume, Gmel, & Daeppen, 2008). Further, negative predictors of outcome included therapist use of closed questions (2/5 studies; Karno & Longabaugh, 2005; Thrasher et al., 2006), the use of simple reflections (2/3 studies; Tollison et al., 2008, 2013), therapist focus on client ambivalence (2/3 studies; Baird et al., 2007; Magill et al., 2012), interpretations, interpreting resistance, and introduction of topics (examined in one study; Karno & Longabaugh, 2005). Karno and Longabaugh (2005) also found that therapist's level of directiveness was negatively related to percent of days abstinent, but only for clients high in reactance.⁶ Strang and McCambridge (2004) showed a positive relationship between directiveness and outcome; however, directiveness in this study referred to the extent to which the therapist provided direction to the MI session, as opposed to the confrontational/teaching type qualities measured in Karno and Longabaugh (2005).

Path 7: Therapist Empathy/MI spirit → Behaviour Change

Collectively, the studies that examined Path 7 offered mixed support for the effect of MI spirit and therapist empathy on outcome (shown in Table IV). Four studies found that behaviour change was unrelated to levels of therapist empathy (Feldstein & Forcehimes, 2007; Magill et al., 2010; Pirlott et al., 2012; Tollison et al., 2013) or MI spirit (Gaume, Gmel, & Daeppen, 2008; Pirlott et al., 2012; Tollison et al., 2013; Woodin et al., 2012). Three studies supported a positive relationship between empathy and outcome (Gaume, Gmel, & Daeppen, 2008), though two of these only found this relationship in sub-samples of participants (Thrasher et al., 2006; Woodin et al., 2012). Three studies showed that the combination of MI spirit and empathy was positively related to client outcome (Baird et al., 2007; Thyrian et al., 2007),

though results of Thrasher et al. (2006) were confined to a sub-sample. Overall, a therapy style characterised by MI spirit and empathy was related to reductions in drinking (Miller et al., 1993; Morgenstern et al., 2012) and reduced blood alcohol concentration (Miller et al., 1993).

Discussion

The overall aim of this review was to examine evidence for the putative causal model suggested by Miller and Rose (2009) and to determine the validity of the relational and technical hypotheses to account for client outcome in MI.

Overall, the results provided support for the technical hypothesis encompassed in Miller and Rose's model. The technical hypothesis suggests that MICO behaviours affect client's CT/resistance, and CT/resistance predicts behaviour change. In line with the meta-analytic findings of Magill et al. (2014), generally, therapist's MICO behaviours were positively related to client CT. In some cases, a sequential pattern emerged whereby clients were more likely to express arguments for change immediately following therapist's use of MICO behaviours and were unlikely to express CT following MIIN behaviours. The relationship between MICO and CT and the decreased likelihood of CT following MIIN behaviours indicates the usefulness of factors like affirmations, reflections, and support in encouraging client CT and also points to behaviours that may hinder the expression of CT (e.g., confrontation, advising without permission, and warning). Therapist use of reflections was the one specific behaviour most often related to CT. Skilful use of reflections can encourage self-exploration and evoke thoughts about change (Miller & Rollnick, 2013) which may explain the relatively consistent relationship found between reflections and change language.

Therapist's relational style variables were not consistently related to CT. Theory suggests that MI spirit and empathy may be enough to foster behaviour change (Miller & Rose, 2009), but perhaps these stylistic variables do not affect CT specifically. MI spirit and empathy are beneficial in MI because they help to create a safe and supportive environment where the client feels comfortable to express their concerns (Miller & Rollnick, 2013). While this type of therapy style might facilitate client expression in general, it may not be imperative to the expression of CT and as suggested by results for Path 1, perhaps the directive (or technical) elements of MI provide the principal catalyst for CT. It is also possible that clinician interpersonal style may be more relevant to other positive client behaviours such as engagement and involvement. Research has demonstrated a

positive relationship between clinician's MI spirit and client engagement behaviours, for example, disclosure, involvement, and cooperation (Boardman, Catley, Grobe, Little, & Ahluwalia, 2006; Catley et al., 2006; Moyers, Miller, & Hendrickson, 2005; Pirlott et al., 2012).

A direct link between MICO behaviour and outcome was not consistently supported by the studies. Of the specific behaviours, a higher ratio of reflections to questions and more use of affirmations appeared to predict positive outcome most consistently; however, only one study presented both significant and non-significant findings for each behaviour category, so these conclusions may be imprecise. The inconsistent link between MICO and outcome may support Miller and Rose's technical hypothesis, which proposes that CT mediates the relationship between MICO and outcome. For CT to act as a mediator, it should be directly related to MICO (a link supported by aforementioned results) and should also relate to client outcome. Generally, it was the case that when clients uttered more positive change statements, they showed better results on outcome variables, for example, reduced drinking and increased fruit and vegetable intake. Regarding CT categories, ability language was the most consistent predictor of outcome across the studies. Clients' who expressed confidence in their capacity to change were more likely to enact behavioural changes. Literature in the field of self-efficacy supports the relationship between client perceived ability and actual change. A higher level of perceived ability to overcome one's problem or engage in positive change behaviours has been associated with better outcomes for problem drinkers (Adamson, Sellman, & Frampton, 2009), sufferers of bulimia nervosa (Steele, Bergin, & Wade, 2011), anorexia nervosa (Pinto, Heinberg, Coughlin, Fava, & Guarda, 2008), and cocaine abusers (Dolan, Martin, & Rohsenow, 2008). Moreover, individuals with higher nutrition self-efficacy were shown to be more likely to act on their intentions and enact change plans (Ochsner, Scholz, & Hornung, 2013), and greater changes in self-efficacy regarding social situations have been related to better outcomes for socially anxious individuals (Gaudiano & Herbert, 2003).

In examining each path separately, the majority of studies supported a positive relationship between MICO and CT and between CT and outcome but did not substantiate a direct link between MICO and outcome. The results provide some evidence for the technical hypothesis, which demarcates CT as a mediator of change. However, many of the studies only provided correlational data, which do not provide evidence for the direction of the

relationship between CT and MICO. Furthermore, in studies that calculated transition probabilities, a two-way relationship between CT and MICO was noted. That is, while CT was more likely to follow MICO than MIIN, MICO was also more likely than MIIN to follow CT (Gaume et al., 2010; Moyers et al., 2009). The transition probability findings demonstrate the potential for client behaviour to affect clinician response during the therapy session; however, they also preserve the temporal relationship between MICO and CT, which provides stronger support for the technical hypotheses than does a correlational design (Moyers et al., 2009).

While there is potential for bidirectional relationships to exist between model paths, those studies that did analyse CT as a mediator provided additional support for the technical hypothesis. For example, Moyers and colleagues (2009) found CT to mediate the effect of therapist MICO behaviours on client's drinking outcomes, and Pirlott et al. (2012) demonstrated that CT mediated the effect of both MICO and MI spirit on change in fruit and vegetable consumption. CT was also found to mediate the relationship between condition (MI spirit or MI with directive elements) and drinking outcome (Morgenstern et al., 2012). Furthermore, these analyses were conducted within a single MI session, which supports the temporal relationship between MICO, CT, and client behaviour change.

The relational hypothesis suggests that therapist's interpersonal style (i.e., MI spirit and empathy) can evoke behaviour change. This hypothesis was not consistently supported in the current review; however, study methodology should be taken into account. Studies that utilised experimental designs to isolate the effect of therapist's style did demonstrate that an overall client-centred style can alone affect behaviour change (Miller et al., 1993; Morgenstern et al., 2012). One noteworthy study examined the effect of MI spirit and empathy, using an experimental paradigm that disaggregated therapist's style (MI spirit/empathy) from the directive elements of MI (i.e., the specific behaviours utilised to facilitate CT). The researchers found that the MI spirit condition had larger reductions in drinking; however, this difference was not significant (Morgenstern et al., 2012). This study suggests, however, that a specific relational style exhibited by the therapist can alone induce behaviour change. Unfortunately, even in employing experimental paradigms, it is difficult to disaggregate the effect of therapist's style from the effect of specific therapist's behaviours. MICO therapist behaviours such as the use of reflections are fundamental to both the directive

method of MI (i.e., reflections are utilised to encourage CT) and the relational style (i.e., reflections help to establish an empathic relationship). Because MI fidelity measures generally do not code the type of reflections, it is difficult to determine whether specific behaviours are used in a relational or directive sense, and thus determining how these behaviours contribute to client outcome is problematic. For example, in examining Path 6 (the relationship between MICO and outcome), it was found that a higher ratio of reflections to questions and greater use of affirmations were related to positive outcome; however, it is uncertain whether these behaviours were used to convey MI spirit or to facilitate expression of CT. Utilising measures that code for types of reflections such as reflections of CT and ST [i.e., the Sequential Code for Observing Process Exchanges (Martin, Moyers, Houck, Christopher, & Miller, 2005)] could help to reduce ambiguity.

While not specifically encompassed in the relational and technical hypotheses, Paths 3 and 4 of the model suggest that client's preparatory CT is related to commitment to behaviour change and commitment to behaviour change is related to outcome, respectively. In light of the studies reviewed, it appears that greater preparatory CT is related to an increased level of commitment to change by the client. These findings offer some support to Path 3 of the Miller and Rose model and also the application of Self-Perception Theory as a framework to understand client behaviour change following MI. With regard to Self-Perception Theory, the expression of CT in MI is thought to facilitate behaviour change because in voicing and hearing their own arguments for change, clients adopt new attitudes and beliefs about change and essentially "talk themselves into" the change process (Miller, 1983). More expression of change language is likely to lead to higher levels of commitment as the client further strengthens their resolve to change. While the results for Path 3 are promising, a larger sample size of studies is necessary to validate the reliability of the findings.

It is speculated that people who express commitment to change are more likely to show behavioural changes in the future (Miller & Rollnick, 2004). However, the results were not consistent in supporting a relationship between client's commitment and outcome (Path 4). The inconsistent results also question the link between Speech Act Theory and MI, which suggests that the obligatory nature of commitment language helps to drive behaviour change (Bricker & Tollison, 2011). However, it is possible that two methodological features of the studies contributed to the variable findings. First,

studies that combined CT categories to predict outcome often combined preparatory language (desire, reason, need, and ability) and the taking steps category with client commitment language. Because the effect of commitment language was often not disaggregated from preparatory CT, the real relationship between expressions of commitment and outcome was not captured. Alternatively, the measurement of commitment may explain differences in study results. Studies that measured total commitment strength or overall frequency generally found inconsistent relationships with outcome; however, three studies demonstrated that when commitment language was measured throughout the session, increases in commitment talk were positively related to outcome (Amrhein et al., 2003; Campbell et al., 2010; Peterson, 2011). These results suggest that a client's movement to a higher level of commitment during MI may be a better predictor of outcome than the frequency or strength of commitment language overall.

Limitations

The current study has a number of limitations that may affect conclusions drawn. First, many of the reviewed studies resulted from samples drawn from larger RCTs. Groups of authors often utilised the same sample in multiple publications to examine separate paths, which may have contributed to more positive or negative results overall depending on the sample. To limit any dependence in the results, studies were excluded if they employed identical samples to examine the same path. However, this does not rule out the potential for publication bias. In order to more clearly ascertain the significance of the model paths, an ideal strategy would be to test the full model in a single large and representative sample.

Additionally, the majority of studies employed alcohol and other substance using populations, which limits the conclusions and validity of Miller and Rose's (2009) model to these groups. Nevertheless, the few studies that did employ non-substance abusing samples support parts of the model in a variety of problem areas, including diet and exercise (Pirlott et al., 2012), therapy adherence (Peterson, 2011; Thrasher et al., 2006), and partner aggression (Woodin et al., 2012).

Methodological quality of the studies was a further limitation. Many of the reviewed studies employed reliable MI fidelity measures, but six studies did not assess fidelity which compromises the quality and "purity" of the MI delivered. Also, in some cases, fidelity measures lacked adequate inter-rater reliability. This was particularly the case when behaviours

were infrequent, for example, MIIN behaviours. The relative paucity of these behaviours during MI sessions made it difficult to rate them reliably, which may have affected the relationships found. In any case, several studies did withdraw unreliable variables from statistical analyses.

A final limitation is the essentially qualitative nature of the review. While the results of this study can shed light on the relational and technical hypotheses proposed by Miller and Rose (2009), meta-analytic work that attempts to quantify the model paths will further enhance the validity of these hypotheses. Magill et al. (2014) have provided meta-analytic support for Paths 1 (the relationship between MICO and CT) and 5 (an overall composite measure of CT was related to better client outcome) in various problem areas. Continuing to examine segments of the model in varying domains may further support the suggested process of MI.

Future Directions

The model suggested by Miller and Rose (2009) outlines a variety of pathways through which MI may lead to behaviour change. However, in evaluating studies, additional process variables that may form part of the causal model were identified. One set of behaviours that may be particularly relevant is client engagement behaviours, for example, client involvement in MI sessions and level of disclosure. The third edition of *Motivational Interviewing* (Miller & Rollnick, 2013) suggests that an important element of MI's effectiveness is the therapist successfully engaging the client in therapy, and as discussed, research has demonstrated a link between therapist style variables and client engagement. A client's level of engagement in MI may affect their expression of CT and level of resistance, potentially moderating the relationship between therapist behaviours and CT. Also, psychotherapy literature in various treatment domains has shown client engagement behaviours to relate to outcome (Tetley, Jinks, Huband, & Howells, 2011). Furthermore, there is some suggestion that MI has a positive effect on the therapist/client's working alliance, a construct akin to Miller and Rollnick's process of engagement in MI. Empirical research has shown high levels of working alliance in MI, though no difference in working alliance has been found between MI and other therapy modalities (Crits-Christoph et al., 2009).

In addition, a direct link may exist between therapist style/behaviours and client commitment to change, bypassing client CT. The findings from Magill et al. (2010) support such a link in that

therapist behaviours were directly related to an indicator of client commitment, client completion of a change plan. Furthermore, proximal outcome variables such as completion of a change plan may be a valuable addition to the model. These variables are not necessarily behavioural outcomes but indicate a step towards change that may contribute to later behaviour changes. Potentially, commitment to change may affect proximal measures of outcome (e.g., attending a therapy group), which in turn facilitate behaviour change. Such a path also supports the suggestion of diverse operationalisation of commitment; potentially, commitment language is just the start of a client's demonstration of commitment, and behavioural indicators of commitment such as completing therapy tasks may be more predictive of actual behavioural changes.

From a methodological standpoint, more experimental research is needed to disaggregate the effect of therapist relational style from directive behaviours to determine how each MI component factors into client outcome. Experimental research could also help to determine which specific therapist behaviours are most relevant to client CT and diminished resistance.

Moreover, commitment language should be analysed independently of the preparatory categories to determine the unique effects of language pertaining to client commitment. Because increasing client commitment is a goal of MI, measuring commitment language throughout the MI session is also recommended in order to capture any changes in commitment and the relationship these changes have to outcome.

Third, comparison conditions are needed to determine if an MI style, MICO behaviours, and client CT is unique to MI. While many of the studies reviewed yielded comparison groups due to their respective RCTs, the majority of these did not compare therapy processes across conditions. This would be an important step to establish the unique process of MI as recent research has demonstrated the effect of alternate therapy styles on elicitation of client CT, for example, CBT (Aharonovich, Amrhein, Bisaga, Nunes, & Hasin, 2008; Moyers et al., 2007) and Twelve-Step Facilitation Therapy (Moyers et al., 2007). Furthermore, examining the underlying mechanisms of MI could potentially inform process research in diverse therapeutic modalities. The relationship between potential mediators of treatment effectiveness and client outcome is elusive in all forms of psychotherapy. Systematically observing the relationship between therapist and client behaviours in a variety of therapy styles may indicate the types of behaviours that are fundamental to psychotherapy process in general, potentially allowing for enhanced client outcome.

Conclusions

The current review examined evidence for a causal chain model hypothesised to account for the process of MI. The relational and technical paths suggested by Miller and Rose are in no way competitive hypotheses (Miller & Rose, 2009). It is vital that both therapist's MI style and behaviour converge to achieve best client outcomes. However, it is important to determine the processes through which MI achieves change in order to improve MI services. The efficiency of MI sessions can be maximised if clinicians focus on those elements of MI known to affect positive client behaviours and outcome. While client CT appears fundamental to the process of MI, further investigation and statistical analyses of CT as a mediator are required in order to more confidently assess the findings.

Notes

- ¹ Paths 8, 9, and 10 (the effect of training in MI on therapist and client behaviours) will not be examined in this review.
- ² In some cases college/university/young adult samples included participants under the age of 18. These studies were included if participants were not referred to as "adolescents."
- ³ Strang and McCambridge (2004) and Magill et al. (2012) utilised therapist-rated measures of clinician behaviour.
- ⁴ The readiness factor proposed by Amrhein et al. (2003) did not commonly occur in MI sessions. Subsequent coding of client language suggested the additional dimension of "taking steps," which relates to verbalisation of action already being taken to change (Miller & Johnson, 2008).
- ⁵ Some studies used "counter-change talk" as a term to describe client arguments away from change, but for clarity "Sustain Talk" (ST) is the term used in the results section.
- ⁶ *Psychological reactance*, defined by Brehm and Brehm (1981) as the tendency to resist relinquishing control in interpersonal situations.

References

- Adamson, S. J., Sellman, J. D., & Frampton, C. M. (2009). Patient predictors of alcohol treatment outcome: A systematic review. *Journal of Substance Abuse Treatment, 36*, 75–86. doi:10.1016/j.jsat.2008.05.007
- Aharonovich, E., Amrhein, P. C., Bisaga, A., Nunes, E. V., & Hasin, D. S. (2008). Cognition, commitment language, and behavioral change among cocaine-dependent patients. *Psychology of Addictive Behaviours, 22*, 557–562. doi:10.1037/a0012971
- *Amrhein, P. C., Miller, W. R., Yahne, C. E., Palmer, M., & Fulcher, L. (2003). Client commitment language during motivational interviewing predicts drug use outcomes. *Journal of Consulting and Clinical Psychology, 71*, 862–878. doi:10.1037/0022-006X.71.5.862
- Apodaca, T. R., & Longabaugh, R. (2009). Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction, 104*, 705–715. doi:10.1111/j.1360-0443.2009.02527.x
- *Apodaca, T. R., Magill, M., Longabaugh, R., Jackson, K. M., & Monti, P. M. (2013). Effect of a significant other on client change talk in motivational interviewing. *Journal of Consulting and Clinical Psychology, 81*, 35–46. doi:10.1037/a0030881
- Austin, J. (1962). *How to do things with words*. Cambridge, MA: Harvard University Press.
- Aviram, A., & Westra, H. A. (2011). The impact of motivational interviewing on resistance in cognitive behavioural therapy for generalized anxiety disorder. *Psychotherapy Research, 21*, 698–708. doi:10.1080/10503307.2011.610832
- *Baird, J., Longabaugh, R., Lee, C. S., Nirenberg, T. D., Woolard, R., Mello, M. J., ... Gogineni, A. (2007). Treatment completion in a brief motivational intervention in the emergency department: The effect of multiple interventions and therapists' behavior. *Alcoholism: Clinical and Experimental Research, 31*, 71s–75s. doi:10.1111/j.1530-0277.2007.00498.x
- Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1–62). New York, NY: Academic Press.
- *Bertholet, N., Faouzi, M., Gmel, G., Gaume, J., & Daeppen, J. B. (2010). Change talk sequence during brief motivational intervention, towards or away from drinking. *Addiction, 105*, 2106–2112. doi:10.1111/j.1360-0443.2010.03081.x
- Boardman, T., Catley, D., Grobe, J. E., Little, T. D., & Ahluwalia, J. S. (2006). Using motivational interviewing with smokers: Do therapist behaviors relate to engagement and therapeutic alliance? *Journal of Substance Abuse Treatment, 31*, 329–339. doi:10.1016/j.jsat.2006.05.006
- Brehm, S. S., & Brehm, J. W. (Eds.). (1981). *Psychological reactance: A theory of freedom and control*. Orlando, FL: Academic Press.
- Bricker, J., & Tollison, S. (2011). Comparison of motivational interviewing with acceptance and commitment therapy: A conceptual and clinical review. *Behavioural and Cognitive Psychotherapy, 39*, 541–559. doi:10.1017/S1352465810000901
- Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology, 71*, 843–861. doi:10.1037/0022-006X.71.5.843
- *Campbell, S. D., Adamson, S. J., & Carter, J. D. (2010). Client language during motivational enhancement therapy and alcohol use outcome. *Behavioural and Cognitive Psychotherapy, 38*, 399–415. doi:10.1017/S1352465810000263
- Cassin, S. E., von Ranson, K. M., Heng, K., Brar, J., & Wojtowicz, A. E. (2008). Adapted motivational interviewing for women with binge eating disorder: A randomized controlled trial. *Psychology of Addictive Behaviours, 22*, 417–425. doi:10.1037/0893-164X.22.3.417
- *Catley, D., Harris, K. J., Mayo, M. S., Hall, S., Okuyemi, K. S., Boardman, T., & Ahluwalia, J. S. (2006). Adherence to principles of motivational interviewing and client within-session behavior. *Behavioural and Cognitive Psychotherapy, 34*, 43–56. doi:10.1017/S1352465805002432
- Crits-Christoph, P., Gallop, R., Temes, C. M., Woody, G., Ball, S. A., Martino, S., & Carroll, K. M. (2009). The alliance in motivational enhancement therapy and counseling as usual for substance use problems. *Journal of Consulting and Clinical Psychology, 77*, 1125–1135. doi:10.1037/a0017045
- *Daeppen, J. B., Bertholet, N., Gmel, G., & Gaume, J. (2007). Communication during brief intervention, intention to change, and outcome. *Substance Abuse, 28*, 43–51. doi:10.1300/J465v28n03_05
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.
- Dolan, S. L., Martin, R. A., & Rohsenow, D. J. (2008). Self-efficacy for cocaine abstinence: Pretreatment correlates and relationship to outcomes. *Addictive Behaviors, 33*, 675–688. doi:10.1016/j.addbeh.2007.12.001

- Draycott, S., & Dabbs, A. (1998). Cognitive dissonance 2: A theoretical grounding of motivational interviewing. *British Journal of Clinical Psychology, 37*, 355–364. doi:10.1111/j.2044-8260.1998.tb01391.x
- Feld, R., Woodside, D. B., Kaplan, A. S., Olmsted, J., & Carter, J. C. (2001, November). Pretreatment motivational enhancement therapy for eating disorders: A pilot study. Presented in poster session at the Eating Disorder Research Society Meeting, Boston, MA.
- *Feldstein, S. W., & Forcehimes, A. A. (2007). Motivational interviewing with underage college drinkers: A preliminary look at the role of empathy and alliance. *The American Journal of Drug and Alcohol Abuse, 33*, 737–746. doi:10.1080/00952990701522690
- *Fischer, D. J. (2012). *Clinician empathic speech and client change language: Is there an association between empathic speech and change talk in motivational interviewing sessions?* (Master's thesis). Retrieved from <http://repository.unm.edu/handle/1928/20977>
- Foot, J., DeLuca, A., Magura, S., Warner, A., Grand, A., Rosenblum, A., & Stahl, S. (1999). A group motivational treatment for chemical dependency. *Journal of Substance Abuse Treatment, 17*, 181–192. doi:10.1016/S0740-5472(99)00003-3
- Gaudiano, B. A., & Herbert, J. D. (2003). Preliminary psychometric evaluation of a new self-efficacy scale and its relationship to treatment outcome in social anxiety disorder. *Cognitive Therapy and Research, 27*, 537–555. doi:10.1023/A:1026355004548
- *Gaume, J., Bertholet, N., Faouzi, M., Gmel, G., & Daeppen, J. B. (2010). Counselor motivational interviewing skills and young adult change talk articulation during brief motivational interventions. *Journal of Substance Abuse Treatment, 39*, 272–281. doi:10.1016/j.jsat.2010.06.010
- *Gaume, J., Bertholet, N., Faouzi, M., Gmel, G., & Daeppen, J. B. (2012). Does change talk during brief motivational interventions with young men predict change in alcohol use? *Journal of Substance Abuse Treatment, 44*, 177–185. doi:10.1016/j.jsat.2012.04.005
- *Gaume, J., Gmel, G., & Daeppen, J. B. (2008). Brief alcohol interventions: Do counsellors' and patients' communication characteristics predict change? *Alcohol, 43*, 62–69. doi:10.1093/alcal/agm141
- *Gaume, J., Gmel, G., Faouzi, M., & Daeppen, J. B. (2008). Counsellor behaviours and patient language during brief motivational interventions: A sequential analysis of speech. *Addiction, 103*, 1793–1800. doi:10.1111/j.1360-0443.2008.02337.x
- *Gibbons, C. J., Carroll, K. M., Ball, S. A., Nich, C., Frankforter, T. L., & Martino, S. (2010). Community program therapist adherence and competence in a motivational interviewing assessment intake session. *The American Journal of Drug and Alcohol Abuse, 36*, 342–349. doi:10.3109/00952990.2010.500437
- *Glynn, L. H., & Moyers, T. B. (2010). Chasing change talk: The clinician's role in evoking client language about change. *Journal of Substance Abuse Treatment, 39*, 65–70. doi:10.1016/j.jsat.2010.03.012
- *Karno, M. P., & Longabaugh, R. (2005). Less directiveness by therapists improves drinking outcomes of reactant clients in alcoholism treatment. *Journal of Consulting and Clinical Psychology, 73*, 262–267. doi:10.1037/0022-006X.73.2.262
- Lundahl, B. W., & Burke, B. L. (2009). The effectiveness and applicability of motivational interviewing: A practice-friendly review of four meta-analyses. *Journal of Clinical Psychology: In Session, 65*, 1232–1245. doi:10.1002/jclp.20638
- Lundahl, B. W., Kunz, C., Brownell, C., Tollefson, D., & Burke, B. L. (2010). A meta-analysis of motivational interviewing: Twenty-five years of empirical studies. *Research on Social Work Practice, 20*, 137–160. doi:10.1177/1049731509347850
- *Magill, M., Apodaca, T. R., Barnett, N. P., & Monti, P. M. (2010). The route to change: Within-session predictors of change plan completion in a motivational interview. *Journal of Substance Abuse Treatment, 38*, 299–305. doi:10.1016/j.jsat.2009.12.001
- Magill, M., Gaume, J., Apodaca, T. R., Walthers, J., Mastroiolo, N. R., Borsari, B., & Longabaugh, R. (2014). The technical hypothesis of motivational interviewing: A meta-analysis of MI's key causal model. *Journal of Consulting and Clinical Psychology*. Advance online publication. Retrieved from <http://dx.doi.org/10.1037/a0036833>
- *Magill, M., Stout, R. L., & Apodaca, T. R. (2012). Therapist focus on ambivalence and commitment: A longitudinal analysis of Motivational Interviewing treatment ingredients. *Psychology of Addictive Behaviours*. Advance online publication. doi:10.1037/a0029639
- Markland, D., Ryan, R. M., Tobin, V. J., & Rollnick, S. (2005). Motivational interviewing and self-determination theory. *Journal of Social and Clinical Psychology, 24*, 811–831. doi:10.1521/jscp.2005.24.6.811
- *Martin, T., Christopher, P. J., Houck, J. M., & Moyers, T. B. (2011). The structure of client language and drinking outcomes in Project MATCH. *Psychology of Addictive Behaviors, 25*, 439–445. doi:10.1037/a0023129
- Martin, T., Moyers, T. B., Houck, J. M., Christopher, P. J., & Miller, W. R. (2005). *Motivational interviewing sequential code for observing process exchanges (MI-SCOPE) coder's manual*. Retrieved from <http://casaa.unm.edu/download/scope.pdf>
- *Martino, S., Ball, S. A., Nich, C., Frankforter, T. L., & Carroll, K. M. (2008). Community program therapist adherence and competence in motivational enhancement therapy. *Drug and Alcohol Dependence, 96*, 37–48. doi:10.1016/j.drugalcdep.2008.01.020
- Martins, R. K., & McNeil, D. W. (2009). Review of motivational interviewing in promoting health behaviors. *Clinical Psychology Review, 29*, 283–293. doi:10.1016/j.cpr.2009.02.001
- McNally, A. M., Palfai, T. P., & Kahler, C. W. (2005). Motivational interventions for heavy drinking college students: Examining the role of discrepancy-related psychological processes. *Psychology of Addictive Behaviors, 19*, 79–87. doi:10.1037/0893-164X.19.1.79
- Miller, W. R. (1983). Motivational interviewing with problem drinkers. *Behavioural Psychotherapy, 11*, 147–172. doi:10.1017/S0141347300006583
- *Miller, W. R., Benefield, R. G., & Tonigan, J. S. (1993). Enhancing motivation for change in problem drinking: A controlled comparison of two therapist styles. *Journal of Consulting and Clinical Psychology, 61*, 455–461. doi:10.1037/0022-006X.61.3.455
- Miller, W. R., & Johnson, W. R. (2008). A natural language screening measure for motivation to change. *Addictive Behaviors, 33*, 1177–1182. doi:10.1016/j.addbeh.2008.04.018
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behaviour*. New York, NY: Guilford Press.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). New York, NY: Guilford Press.
- Miller, W. R., & Rollnick, S. (2004). Talking oneself into change: Motivational interviewing, stages of change, and therapeutic process. *Journal of Cognitive Psychotherapy: An International Quarterly, 18*, 299–308. doi:10.1891/jcop.18.4.299.64003
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York, NY: Guilford Press.

- Miller, W. R., & Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist*, 64, 527–537. doi:10.1037/a0016830
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6, 1–6. doi:10.1371/journal.pmed.1000097
- *Morgenstern, J., Kuerbis, A., Amrhein, P., Hail, L., Lynch, K., & McKay, J. R. (2012). Motivational interviewing: A pilot test of active ingredients and mechanisms of change. *Psychology of Addictive Behaviors*, 26, 859–869. doi:10.1037/a0029674
- Moyers, T. B., Martin, T., Christopher, P. J., Houck, J. M., Tonigan, J. S., & Amrhein, P. C. (2007). Client language as a mediator of motivational interviewing efficacy: Where is the evidence? *Alcoholism Clinical and Experimental Research*, 31, 40s–47s. doi:10.1111/j.1530-0277.2007.00492.x
- *Moyers, T. B., Martin, T., Houck, J. M., Christopher, P. J., & Tonigan, J. S. (2009). From In-session behaviors to drinking outcomes: A causal chain for motivational interviewing. *Journal of Consulting and Clinical Psychology*, 77, 1113–1124. doi:10.1037/a0017189.supp
- Moyers, T. B., Miller, W. R., & Hendrickson, S. M. (2005). How does motivational interviewing work? Therapist interpersonal skill predicts client involvement within motivational interviewing sessions. *Journal of Consulting and Clinical Psychology*, 73, 590–598. doi:10.1037/0022-006X.73.4.590
- Ochsner, S., Scholz, U., & Hornung, R. (2013). Testing phase-specific self-efficacy beliefs in the context of dietary behaviour change. *Applied Psychology: Health and Well-being*, 5, 99–117. doi:10.1111/j.1758-0854.2012.01079.x
- *Perry, C. K., & Butterworth, S. W. (2011). Commitment strength in motivational interviewing and movement in exercise stage of change in women. *Journal of the American Academy of Nurse Practitioners*, 23, 509–514. doi:10.1111/j.1745-7599.2011.00637.x
- *Peterson, S. L. (2011). *Influence of depressive symptoms on within-session change talk and HIV antiretroviral medication adherence in a motivational interviewing based adherence intervention* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Database (UMI No. 3490946).
- Pinto, A. M., Heinberg, L. J., Coughlin, J. W., Fava, J. L., & Guarda, A. S. (2008). The eating disorder recovery self-efficacy questionnaire (EDRSQ): Change with treatment and prediction of outcome. *Eating Behaviors*, 9, 143–153. doi:10.1016/j.eatbeh.2007.07.001
- *Pirlott, A. G., Kisbu-Sakarya, Y., DeFrancesco, C. A., Elliot, D. L., & Mackinnon, D. P. (2012). Mechanisms of motivational interviewing in health promotion: A Bayesian mediation analysis. *International Journal of Behavioural Nutrition and Physical Activity*, 9, 69. doi:10.1186/1479-5868-9-69
- *Prabhu, G. C. (2008). *Evaluation of therapist and client language in motivational interviewing (MI) sessions: A secondary analysis of data from the Southern Methodist Alcohol Research Trial (SMART) study* (Master's thesis). Retrieved from ProQuest Dissertations and Theses Database (UMI No. 1454138).
- *Sargeant, M. N. (2011). *Psycholinguistic indicators of motivation for substance use behaviour change among individuals with serious mental illness* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Database (UMI No. 3479049).
- Steele, A. L., Bergin, J., & Wade, T. D. (2011). Self-efficacy as a robust predictor of outcome in guided self-help treatment for broadly defined bulimia nervosa. *International Journal of Eating Disorders*, 44, 389–396. doi:10.1002/eat.20830
- *Strang, J., & McCambridge, J. (2004). Can the practitioner correctly predict outcome in motivational interviewing? *Journal of Substance Abuse Treatment*, 27, 83–88. doi:10.1016/j.jsat.2004.05.003
- Tetley, A., Jinks, M., Huband, N., & Howells, K. (2011). A systematic review of measures of therapeutic engagement in psychosocial and psychological treatment. *Journal of Clinical Psychology*, 67, 927–941. doi:10.1002/jclp.20811
- The Motivational Interviewing Network of Trainers. (1983/2012). *MI Bibliography* [Online Bibliography]. Retrieved January 2012, from <http://www.motivationalinterview.org>
- *Thrasher, A. D., Golin, C. E., Earp, J. A., Tien, H., Porter, C., & Howie, L. (2006). Motivational interviewing to support antiretroviral therapy adherence: The role of quality counseling. *Patient Education and Counseling*, 62, 64–71. doi:10.1016/j.pec.2005.06.003
- *Thyrian, J. R., Freyer-Adam, J., Hannover, W., Roske, K., Mentzel, F., Kufeld, C., ... Hapke, U. (2007). Adherence to the principles of motivational interviewing, clients' characteristics and behavior outcome in a smoking cessation and relapse prevention trial in women postpartum. *Addictive Behaviors*, 32, 2297–2303. doi:10.1016/j.addbeh.2007.01.024
- *Tollison, S. J. (2010). *Motivational interviewing as a mechanism of change in a brief alcohol intervention for college students* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses Database (UMI No. 3431711).
- *Tollison, S. J., Lee, C. M., Neighbors, C., Neil, T. A., Olson, N. D., & Larimer, M. E. (2008). Questions and reflections: The use of motivational interviewing microskills in a peer-led brief alcohol intervention for college students. *Behaviour Therapy*, 39, 183–194. doi:10.1016/j.beth.2007.07.001
- *Tollison, S. J., Mastroleo, N. R., Mallett, K. A., Witkiewitz, K., Lee, C. M., Ray, A. E., & Larimer, M. E. (2013). The relationship between baseline drinking status, peer motivational interviewing microskills, and drinking outcomes in a brief alcohol intervention for matriculating college students: A replication. *Behavior Therapy*, 44, 137–151. doi:10.1016/j.beth.2012.09.002
- *Vader, A. M., Walters, S. T., Prabhu, G. C., Houck, J. M., & Field, C. A. (2010). The language of motivational interviewing and feedback: Counselor language, client language, and client drinking outcomes. *Psychology of Addictive Behaviors*, 24, 190–197. doi:10.1037/a0018749
- *Walker, D., Stephens, R., Rowland, J., & Roffman, R. (2011). The influence of client behavior during motivational interviewing on marijuana treatment outcome. *Addictive Behaviors*, 36, 669–673. doi:10.1016/j.addbeh.2011.01.009
- Westra, H. A., Arkowitz, H., & Dozois, D. J. (2009). Adding a motivational interviewing pretreatment to cognitive behavioral therapy for generalized anxiety disorder: A preliminary randomized controlled trial. *Journal of Anxiety Disorders*, 23, 1106–1117. doi:10.1016/j.janxdis.2009.07.014
- Westra, H. A., & Dozois, D. J. A. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and Research*, 30, 481–498. doi:10.1007/s10608-006-9016-y
- *Woodin, E. M., Sotskova, A., & O'Leary, K. D. (2012). Do motivational interviewing behaviors predict reductions in partner aggression for men and women? *Behavior Research and Therapy*, 50, 79–84. doi:10.1016/j.brat.2011.11.001

Appendix

Table A1. MI characteristics.

Study	Type of MI	Number of sessions	Session length	Portion coded
Amrhein et al. (2003)	MI	1	45–90 min	Whole session
Apodaca et al. (2013)	MI	1	Variable length	Whole session
Baird et al. (2007)	BMI	1 or 2 ^a	Not specified	Therapists rated at end of each session
Bertholet et al. (2010)	BMI	1	15–20 min	Whole session
Campbell et al. (2010)	MET	4	50 min	All sessions
Catley et al. (2006)	MI	7	30 min	First session—First 20 min
Daeppen et al. (2007)	BMI	1	15 min	Whole session
Feldstein and Forchimes (2007)	MI	1	45 min	Random 20 min
Fischer (2012)	MI	4 ^b	Variable length	Second session—quasi-random selection of 20-min segment (excluded first 5 min of session)
Gaume et al. (2010)	BMI	1	20–30 min	Whole session
Gaume et al. (2012)	BMI	1	20–30 min	Whole session
Gaume, Gmel, and Daeppen (2008)	BMI	1	Approximately 15 min	Whole session
Gaume, Gmel, Faouzi, et al. (2008)	BMI	1	Approximately 15 min	Whole session
Gibbons et al. (2010)	MI assessment	1	Not specified	First and last 20 min
Glynn and Moyers (2010)	CT/FA conditions	1	60 min	Whole session (2 × 12 min segments of CT/2 × 12 min segments of FA)
Karno and Longabaugh (2005)	MET	4	Variable length	All sessions
Magill et al. (2010)	MI	1	Not specified	Whole session
Magill et al. (2012)	MET	4	Variable length	All sessions
Martin et al. (2011)	MET	4	Variable length	First session
Martino et al. (2008)	MET	3	50 min	All sessions
Miller et al. (1993)	Drinkers check-up	1	Not specified	Whole feedback session
Morgenstern et al. (2012)	MI/SOMI	4	45–60 min	First two sessions
Moyers et al. (2009)	MET	4	Variable length	First session
Perry and Butterworth (2011)	MI	1 ^c	30 min	Whole session
Peterson (2011)	MI	5 ^d	7–72 min	Second session
Pirlott et al. (2012)	MI	4	30–60 min	Second session
Prabhu (2008)	MI	1	45–60 min	Whole session
	MI + FB		60–90 min	
Sargeant (2011)	MI	3 ^e	20–35 min	First session
Strang and McCambridge (2004)	MI	1	60 min	Therapist rated
Thrasher et al. (2006)	MI	4	Variable length ($M = 30$ min)	Second session
Thyrian et al. (2007)	MI	1 ^f	Not specified	Random 20 min
Tollison (2010)	BASICS	1	60 min	Whole session
Tollison et al. (2008)	BASICS	1	60 min	Random 20 min
Tollison et al. (2013)	BASICS	1	45–60 min	Random 20 min
Vader et al. (2010)	MI	1	$M = 36$ min	Whole session
	MI + FB		$M = 45$ min	
Walker et al. (2011)	MI	1	Variable length	Whole session
Woodin et al. (2012)	MI	1 ^g	45 min	Whole session

MI = Motivational Interview; BMI = Brief Motivational Interview; MET = Motivational Enhancement Therapy; CT = Change Talk; FA = Functional Analysis; SOMI = MI Spirit only MI; FB = Feedback; BASICS = Brief Alcohol Screening and Intervention for College Students; M = Mean.

^aParticipants received one or two sessions of MI depending on randomisation.

^bSample was derived from clinicians, of which each clinician had four sessions of MI (post-training, 3, 6, and 12 months).

^cFollowing MI participants received six 10-min booster phone calls (these were not recorded).

^dFollowing MI participants received four 15-min MI phone calls.

^eParticipants received other behavioural treatment over 52 weeks with an MI session before starting treatment and at 3 and 6 months.

^fFollowing MI participants received two calls 4 and 12 weeks later.

^gEach partner received an individual MI and feedback together. The feedback session was not recorded.

Following publication of Chapter Two additional studies have been published that add to the developing literature on the MI causal model. This interleaving section briefly outlines the results of research that examines elements of the causal model not reviewed in Chapter Two. Table 1, 2, and 3, present research that examines the relationship between therapist and client behavior in MI, the relationship between client language and outcome, and the relationship between therapist behavior and outcome, respectively. Each study investigated paths of the MI causal model in populations of problematic alcohol users.

In examining the relationship between therapist and client behaviors the results from the two studies were not unanimous. Overall, MI-consistent behaviors (MICO) were positively related to change talk (CT) and sustain talk (ST or counter-change talk (CCT)) (Apodaca et al., 2016; Borsari et al., 2014), though MI-Inconsistent behaviors (MIIN) were less consistently related to client language. Therapist global ratings of therapist empathy and MI Spirit were related to increased CT, ST, and client self-exploration in both studies of the Borsari et al. paper.¹

Four studies examined the link between client language and outcome and demonstrated that in general ST was a more consistent predictor of drinking outcomes (poorer drinking outcomes) than CT. Gaume, Magill, et al. (2016) highlighted the role of change language strength as a predictor of treatment outcome and found that client characteristics such as readiness and problem severity moderate the effect of change language strength on outcome. Furthermore, Houck and Moyers (2015) provided the first examination of the effect of language transitions during MI sessions on drinking outcomes and client self-exploration was also found to predict drinking outcomes in two studies (Apodaca et al., 2014; Borsari et al., 2014). Finally, regarding the effect of therapist relational style and behaviors on outcome, the results were inconsistent. Across the studies, MICO and MIIN did not consistently predict

¹ A study by Fischer and Moyers (2014) was also published however the unpublished version of this study was presented in the review and thus is not re-presented here.

drinking outcomes. MI Spirit predicted better outcomes in two samples (Borsari et al., 2014: Study 2 and; Bertholet, Palfai, Gaume, Daeppen, & Richard, 2014: Swiss-Two RCT), though was associated with more drinking in the Swiss-One sample (Bertholet et al., 2014), and was not related to outcome in Apodaca et al. (2014). Empathy predicted better outcome in both samples represented in Borsari et al. but was not related to outcome in Apodaca et al.

Taken together, the result pertaining to the effect of therapist behaviors on outcome are inconsistent, though the findings of Gaume et al. (2014) could offer an explanation as to why inconsistencies may occur. Gaume et al. found that the relationship between therapist behavior and drinking outcome was dependent on the frequency of behavior. For example, if the therapist demonstrated between 0-49 MICO behaviors the patient had better outcome, however if the frequency of MICO was 50 or higher, there was no association between MICO and outcome. These results suggest that perhaps it is the exact frequency and combination of behaviors during MI that contributes to MI efficacy.

Two studies examined meditational models (Borsari et al. 2014 and Gaume, Longabaugh, et al. 2016), with Gaume, Longabaugh et al. also examining moderating characteristics such as therapist experience and alcohol severity. Borsari et al. found that across the drinking outcome variables, the paths from MICO to client utterances were significant for CT and ST, though MIIN, therapist acceptance, and empathy, did not predict client speech. There was also a significant path between MI Spirit and self-exploration. The only client to outcome path to reach significance was the path from self-exploration to weekly drinking. In turn, the only mediated effect to approach significance was the path from MI Spirit to client self-exploration to alcohol use (weekly drinking and typical estimated blood alcohol concentration), whereby MI Spirit was positively associated with self-exploration, which in turn was negatively associated with alcohol use. Gaume, Longabaugh, et al. found that higher CT strength predicted less drinking at follow-up, though MICO did not significantly predict CT strength, therefore no mediation was observed. However, CT strength

was found to mediate the relationship between MICO and drinking outcomes when therapists had three or more years experience in MI (i.e., more MICO related to higher CT strength which related to less drinking). There was also a near significant conditional indirect effect when considering young men with higher severity in terms of alcohol use patterns. In the meditational model that contained both therapist experience and alcohol problem severity as moderators, alcohol problem severity did not significantly moderate the CT strength to outcome path. However, the conditional indirect effect was significant when therapists with higher MI experience met with young men with higher severity. In contrast, the conditional indirect effect was in the opposite direction (i.e., more MICO related to lower CT strength which was related to more drinking) when therapists with less experience met with young men with low severity. These results further demonstrate that there may be particular conditions through which the MI causal model explains the outcome severity for problem drinkers.

Table 1.

Study characteristics and results for Path 1 and 2

Study	Target Problem	n	Process Measure	Comparison Condition	Path Examined	Results
Apodaca et al. (2016)	Alcohol	92	MISC 2.0	None	1	OQ, CR, SR, were significantly more likely to be followed by CT, ST, and less likely to be followed by FN. Affirm was more likely to be followed by ST, and less likely to be followed by CT and FN. The MICO category was more likely to be followed by CT and ST, and less likely to be followed by FN. MIIN did not significantly transition to any client language category. Other therapist behaviors were less likely to transition to CT, ST, and more likely to FN. Of the specific other behaviors, facilitate was not significant, giving information and closed questions were less likely to transition to CT, CCT and more likely to FN.
Borsari et al. (2014)	Alcohol	91+158	MISC 2.0	None ^a	1+2	Study 1: MICO, MIIN, and Other ^b therapist behaviors were positively related to CT, ST, and FN. Other ^b behaviors were also positively related to self-exploration. Global ratings of Acceptance, Empathy, and MI Spirit were positively related to CT, ST, and self-exploration. Study 2: MICO was positively related to CT, CCT, FN, and self-exploration. MIIN was negatively related to CT, CCT, and self-exploration (not related to FN). Other ^b therapist behaviors were not related to CT or self-exploration, and positively related to ST and FN. Acceptance was not related to CT, ST, or FN, but was positively related to self-exploration. Empathy and MI spirit were positively related to CT, ST, and self-exploration (not related to FN).

Note. MISC = Motivational Interviewing Skill Code; OQ = open question; CR = complex reflection; SR = simple reflection; CT = change talk; ST = sustain talk; FN = follow/neutral; MICO = MI Consistent behaviors; MIIN = MI Inconsistent behaviors.

^aNo comparison condition used in the current study. ^bIn this study Other behaviors comprised of: facilitate, filler, closed question, giving information, support, and structure.

Table 2.

Study characteristics and results for Path 5

Study	Target Problem	n	Process Measure	Comparison Condition	Path Examined	Results
Apodaca et al. (2014)	Alcohol	92	MISC 2.0	None	5	ST significantly predicted more heavy drinking days and alcohol related problems, and higher average number of drinks per drinking day and pBAC at both 3 month and 12 month follow-up points, controlling for sex, baseline drinking, and session length. Self-exploration predicted decreased heavy drinking days at 3 months and a smaller average number of drinks per drinking day and lower pBAC at 12 months. CT did not predict drinking outcomes.
Borsari et al. (2014)	Alcohol	91+158	MISC 2.0	None ^a	5	Study 1: ST was related to greater HED at the 6-month follow-up. CT, FN, and Self-exploration were not related to any drinking outcome variables. In regression analyses, CT, ST, FN, and self-exploration did not predict drinking outcomes. Study 2: FN was related to greater HED and higher pBAC and tBAC. Self-exploration also correlated with lower tBAC, though CT and ST were not related to drinking outcomes. CT predicted lower HED and tBAC. FN positively predicted pBAC and tBAC and self-exploration predicted lower tBAC.
Gaume et al. (2016)	Alcohol	174	MISC 2.1	None ^a	5	Overall negative CT frequency predicted worse drinking outcomes, and the overall average CT strength predicted better drinking outcomes. Overall positive CT frequency and % positive CT were not significantly related to outcome. Regarding the frequency of each strength rating, the frequency of CT-2 was significantly related to poorer outcome and CT-3 demonstrated an overall trend in the same direction. CT+1 and CT+2 were not significant, though the occurrence of one or more CT+3 utterances was associated with better outcomes. In examining the predictive ability of positive and negative CT strength, a higher frequency of CT-2 was significantly related to more drinking while one or more utterances of CT+3 was related to less drinking. Unexpectedly, CT+2 was marginally related to more drinking. Participants with higher baseline readiness to change had lower predicted drinking when they expressed more CT+1 and CT+2, but participants with lower readiness had higher predicted drinking when they expressed more CT+1 and CT+2. Participants with higher alcohol problem severity had better outcome when they expressed more CT+2 and those with lower alcohol problem severity had higher drinking when they expressed CT+2. ^b
Houck & Moyers (2015)	Alcohol	118	MI-SCOPE	None ^a	5	In the within-treatment period, significant effects were detected for the CT count, readiness to change, and both the CT to CT transition and the therapist-initiated transition CT to RefCT, for both the intercept (DPW at week 5) and the linear slope of DPW. A higher CT count and a greater probability of transitioning from CT in one utterance to CT (or to RefCT) in the next utterance was related to lower within-treatment drinking. In the proximal period, significant effects on the DPW intercept (Week 9) were detected only for the CT to CT transition and for the baseline measure of DPW. A higher probability of transitioning from CT in one utterance to CT in the next utterance was related to lower proximal drinking but not the slope of DPW.

Note. MISC = Motivational Interviewing Skill Code; ST = sustain talk; pBAC = peak estimated blood alcohol concentration; FN = follow/neutral; HED = heavy episodic drinking; CT = change talk; tBAC = typical estimated blood alcohol concentration; RefCT = reflections of CT.

^a No comparison condition used in the current study. ^b This study categorized change language as either positive (towards change) or negative (away from change) CT. A minus sign reflects negative CT and a positive sign reflects positive CT.

Table 3.

Study characteristics and results for Path 6 and 7

Study	Target Problem	n	Process Measure	Comparison Condition	Path Examined	Results
Apodaca et al. (2014)	Alcohol	92	MISC 2.0	None	6, 7	MICO, MIIN, acceptance, and MI Spirit did not significantly predict alcohol drinking outcomes at the 3-month and 12-month follow-up points.
Bertholet et al. (2014)	Alcohol	124+62+128	MISC 2.1 TPRS	None	6, 7	US RCT: Self-exploration and therapist confrontation were associated with more drinks per day. Swiss-One RCT: Giving advice was associated with less drinking and MI Spirit was associated with more drinking. Swiss-Two RCT: MI Spirit was associated with less drinking. Therapist empathy and structure were not related to drinking outcomes in any RCT.
Borsari et al. (2014)	Alcohol	91+158	MISC 2.0	None ^a	6, 7	Study 1: MICO and MIIN were positively correlated with alcohol related problems. Acceptance, empathy, and MI Spirit were related to fewer DPW (Other therapist behaviours were not related) ^b . In regression analyses Acceptance predicted fewer DPW, and HED, and empathy predicted fewer DPW (MICO, MIIN, Other were not significant of drinking outcomes). Study 2: Other therapist behaviours were associated with more HED, alcohol related problems and higher pBAC and tBAC. Acceptance and MI Spirit related to lower pBAC and tBAC. Empathy correlated with lower tBAC. MICO and MIIN did not predict drinking outcomes, though Other therapist behaviours positively predicted DPW and higher tBAC. Acceptance, Empathy, and MI-Spirit predicted lower tBAC.
Gaume et al. (2014)	Alcohol	174	MISC 2.1	No intervention	6, 7	Therapist MI global rating (Acceptance, Empathy, MI Spirit) was related to better outcome when the mean was 5.33 or over (there was no relationship to outcome if the mean ranged from 0 -5.33). The frequency of MICO was related to better outcome if in the range of 0-49, but if the frequency was 50 and above, MICO did not predict outcome. Outcome was significantly better if there were 0 MIIN utterances, however, if the frequency of MIIN was , there was no association with outcome. If the percentage of complex reflections ranged between 0-7.7% there was no relationship with outcome. A percentage of complex reflections 7.8 or higher predicted better treatment outcome.

Note. MISC = Motivational Interviewing Skill Code; TPRS = Therapy Process Rating Scale; MICO = MI Consistent behaviours; MIIN = MI Inconsistent behaviours; DPW = drinks per week; HED = heavy episodic drinking; Pbac = peak estimated blood alcohol concentration; tBAC = typical estimated blood alcohol concentration.

^aNo comparison condition used in the current study. ^bIn this study Other behaviors comprised of: facilitate, filler, closed question, giving information, support, structure.

Aside from the aforementioned research, there has been further examination of the MI causal model in the context of MI group therapy for substance abusing adolescents. While this research does not fit the selection criteria of the Chapter Two review, a brief outline of this research is presented below given the importance of these findings to the overall accumulation of evidence regarding the relational and technical elements of MI.

In terms of the relationship between therapist and client behaviors adolescent research corresponded with adult research in supporting the role of reflections in eliciting change language. In two studies, reflections of CT were more likely than expected by chance to be followed by CT, though when the facilitator reflected ST, CT was suppressed and ST was more likely (Barnett, Spruijt-Metz et al., 2014; D'Amico et al. 2015). Open and closed questions were also significantly more likely to transition to CT, ST, and FN (D'Amico et al., 2015). Houck, Hunter and Damico (2016) further examined the temporal relationship between therapist and adolescent speech by analyzing the association between behavior variables during successive segments of a group session. Results suggested that the count of CT in several segments predicted reflections of CT in subsequent segments. Contrary to this, the effect of facilitator open questions were found only at the beginning and end of the session, when open questions respectively suppressed and enhanced client expressions of CT. In terms of the link between adolescent change language categories and outcome, positive commitment language has been related to decreased alcohol use, heavy drinking, alcohol consequences and alcohol intentions. Positive ability language has been linked to increased marijuana use, consequences, and intentions, while positive reasons language was related to decreased alcohol use, heavy drinking, and alcohol intentions, and negative reasons shown to be unrelated to outcome variables (Osilla et al., 2015). Overall categories of change language have also been related to outcome. For example, CT was associated with decreases in past 30-day alcohol use, heavy drinking in the past 30 days, and intentions to use alcohol, and ST was associated with reductions in motivation to change, increased intentions to use marijuana and

positive expectancies for alcohol and marijuana (D'Amico et al., 2015). Therapist relational style and complex reflections have also been supported as predictors of treatment outcome, with MI Spirit, autonomy support, and complex reflections each predicting better outcomes in terms of alcohol-related problems (though did not predict binge drinking days, marijuana use days, or marijuana-related problems) (Feldstein Ewing, Gaume, Ernst, Rivera, & Houck, 2015). One study examined CT as a mediator of marijuana use outcome, and found that percentage of CT was a mediator of the effect of percent open questions, and the ratio of reflections to questions. The percentage of reflections of CT showed a significant main effect of marijuana outcomes, but not a significant indirect effect through CT (Barnett, Moyers et al., 2014).

Overall the results of the recently published studies provide some evidence for the MI causal model and in general correspond to the findings of Chapter Two in demonstrating a relationship between therapist behaviors and client language, and between client language and outcome, particularly adding to the research about the negative effect of ST on drinking outcome. Furthermore, the recent findings offer some support, albeit not conclusive, for the relational hypothesis, whereby therapist relational factors were associated with outcome variables. However, the findings are inconsistent in terms of which therapist and client factors in particular share a relationship with each other and outcome. Moreover, the research presented is dominated by studies conducted in the realm of substance abuse and it is often the case that the same sample is used for multiple studies, which limits the generalizability of the findings. Therefore, the following chapter presents the paper entitled "Evaluating the mechanisms of change in motivational interviewing in the treatment of mental health problems: A review and meta-analysis". This second review aimed to examine MI mechanisms not restricted to the MI causal model in populations diagnosed with mood, anxiety, eating, and psychotic disorders, and patients with comorbid mental health conditions.

References

- Apodaca, T. R., Jackson, K. M., Borsari, B., Magill, M., Longabaugh, R., Mastroleo, N. R., & Barnett, N. P. (2016). Which individual therapist behaviors elicit client change talk and sustain talk in motivational interviewing. *Journal of Substance Abuse Treatment, 61*, 60 – 65. doi: 10.1016/j.jsat.2015.09.001
- Apodaca, T. R., Borsari, B., Jackson, K. M., Magill, M., Longabaugh, R., Mastroleo, N. R., & Barnett, N. P. (2014). Sustain talk predicts poorer outcomes among mandated college drinkers receiving a brief motivational intervention. *Psychology of Addictive Behaviors, 28*, 631 – 638. doi: 10.1037/a0037296
- Barnett, E., Moyers, T. B., Sussman, S., Smith, C., Rohrbach, L. A., Sun, P., Spuijt-Metz, D. (2014). From counselor skill to decreased marijuana use: Does change talk matter? *Journal of Substance Abuse Treatment, 46*, 498–505. doi: 10.1016/j.jsat.2013.11.004
- Barnett, E., Spruijt-Metz, D., Moyers, T. B., Smith, C., Rohrbach, L. A., Sun, P., Sussman, S. (2014). Bidirectional relationships between client and counselor speech: The importance of reframing. *Psychology of Addictive Behaviors*. Advance online publication. doi: 10.1037/a0036227
- Bertholet, N., Palfai, T., Gaume, J., Daepfen, J.B., & Richard, S. (2014). Do brief alcohol motivational interventions work like we think they do? *Alcoholism: Clinical and Experimental Research, 38*. 853 – 859. doi: 10.1111/acer.12274
- Borsari, B., Apodaca, T. R., Jackson, K. M., Mastroleo, N. R., Magill, M., Barnett, N. P., & Carey, K. B. (2014). In-session processes of brief motivational interventions in two trials with mandated college students. *Journal of Consulting and Clinical Psychology*, Advance Online Publication. doi: 10.1037/a0037635

- D'Amico, E.J., Houck, J.M., Hunter, S.B., Miles, J.N.V., Osilla, K.C., Ewing, B.A. (2014). Group motivational interviewing for adolescents: Change talk and alcohol and drug outcomes. *Journal of Consulting and Clinical Psychology*, 83, 68–80. Advance online publication. <http://dx.doi.org/10.1037/a0038155>
- Feldstein Ewing, S. W., Gaume, J., Ernst, D. B., Rivera, L., & Houck, J. M. (2015). Do therapist behaviors differ with Hispanic youth? A brief look at within-session therapist behaviors and youth treatment response. *Psychology of Addictive Behaviors*, 29, 779 – 786. doi: 10.1037/adb0000079
- Gaume, J., Longabaugh, R., Magill, M., Bertholet, N., Gmel, G., & Daeppen, J.B. (2016). Under what conditions? Therapist and client characteristics moderate the role of change talk in brief motivational intervention. *Journal of Consulting and Clinical Psychology*, 84, 211-220. doi: 10.1037/a0039918
- Gaume, J., Magill, M., Mastroleo, N. R., Longabaugh, R., Bertholet, N., Gmel, G., & Daeppen, J.B. (2016). Change talk during brief motivational intervention with young adult males: Strength matters. *Journal of Substance Abuse Treatment*, 65, 58-65. doi: 10.1016/j.jsat.2016.01.005
- Gaume, J., Magill, M., Longabaugh, R., Bertholet, N., Gmel, G., & Daeppen, J.B. (2014). Influence of counselor characteristics and behaviors on the efficacy of brief motivational intervention for heavy drinking in young men – A randomized controlled trial. *Alcoholism: Clinical and Experimental Research*, 38, 2138 – 2147. doi: 10.1111/acer.12469
- Houck, J., Hunter, S., Benson, J. G., Cochrum, L. L., Rowell, L. N., & D'Amico, E. J. (2016). Temporal variation in facilitator and client behavior during group motivational interviewing sessions. *Psychology of Addictive Behaviors*, 29, 941 - 949. doi: 10.1037/adb0000107
- Houck, J., & Moyers, T. B. (2015). Within-session communication patterns predict alcohol treatment outcomes. *Drug and Alcohol Dependence*, 157, 205 – 209.

Osilla, K. C., Ortiz, J. A., Miles, J. N. V., Pedersen, E. R., Houck, J. M., & D'Amico, E. J. (2015). How group factors affect adolescent change talk and substance use outcomes: Implications for motivational interviewing training. *Journal of Counseling Psychology*, 62, 79 – 86. doi: 10.1037/cou0000049

Chapter 3

Evaluating the mechanisms of change in motivational interviewing in the treatment of mental health problems: A review and meta-analysis.

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Ms. Mia Romano was solely responsible for the design of the research, analysis and write-up of this paper. Dr. Peters provided statistical and research supervision



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Evaluating the mechanisms of change in motivational interviewing in the treatment of mental health problems: A review and meta-analysis



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HIGHLIGHTS

- Motivational interviewing (MI) is useful in the treatment of a variety of mental health problems.
- Previous meta-analyses of MI mechanisms of change are limited to substance using populations.
- This review examined change mechanisms in patients diagnosed with anxiety, mood, eating, psychotic, and comorbid conditions.
- Research should further examine MI mechanisms of change in diverse populations.

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ABSTRACT

Motivational interviewing (MI) has proven useful in the treatment of a variety of mental health problems, however the mechanisms of MI's success within these populations remain unknown. This review is a first attempt to investigate and meta-analyse MI mechanisms of change research conducted with participants who suffer mood, anxiety, psychotic, eating disorders, and comorbid conditions. Twenty studies met inclusion criteria and examined a range of potential MI mechanisms, including patient motivation and confidence, patient resistance, and engagement. Results indicated that while MI did not increase patient motivation more so than did comparison conditions, MI showed a favourable effect on patient engagement variables. However, medium to high levels of heterogeneity were detected for patient engagement, indicating significant differences between studies. Heterogeneity was somewhat explained through subgroup analyses examining the effect of comparison condition and participant diagnosis. Overall, there were few MI mechanisms of change available for review, though the results suggest that patient engagement with treatment may be a potential mechanism of change in populations diagnosed with anxiety, mood, and psychotic disorders.

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1. Introduction

Motivational Interviewing (MI) is a patient centred directive method of facilitating change that aims to enhance motivation through the exploration and resolution of ambivalence (Miller & Rollnick, 1991). MI was originally developed to treat substance use disorders, however, the application of MI has extended to a growing list of psychological and physical health issues. Meta-analytic research provides support for the efficacy of MI in the treatment of physical activity, dietary change, and diabetes (Martins & McNeil, 2009), and gambling and general health promoting behaviours (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). There is also a growing evidence base to suggest that MI is useful as an adjunctive treatment to enhance treatment outcomes for patients presenting with anxiety disorders (Aviram & Westra, 2011; Westra, Arkowitz, & Dozois, 2009; Westra & Dozois, 2006), eating disorders (Cassin, von Ranson, Heng, Brar, & Wojtowicz, 2008), and comorbid mental health and substance use conditions (Martino, Carroll, Nich, & Rounsaville, 2006; Steinberg, Ziedonis, Krejci, & Brandon, 2004).

Though evidence is mounting for the efficacy of MI in a variety of problem areas, not all research trials have found that MI is linked to positive treatment outcomes. The inconsistent results from research trials do not appear to be related to study methodology or characteristics of the MI intervention. Consequently, an investigation of the mechanisms by which MI exerts its effect in various populations may help to account for differential treatment outcomes (Magill et al., 2014). An understanding of the mechanisms of change in MI may guide the administration of MI in diverse populations and contribute to more positive patient outcomes.

A review by Apodaca and Longabaugh (2009) was the first to explore the field of studies examining potential mechanisms of change in MI in those with a substance use disorder. The review examined both patient (readiness (motivation), confidence, engagement, and experience of discrepancy) and therapist (MI consistent and inconsistent conduct, MI spirit¹ and empathy) factors proposed as mechanisms of change in MI. Each therapist and patient factor was evaluated as a mechanism of change by considering three links in a hypothesised causal chain (Shown in Fig. 1): Link 1, the relationship between MI and the proposed mechanism (therapist/patient behaviour); Link 2, the relationship between therapist and patient behaviour; and, Link 3, the extent to which the proposed mechanism (therapist/patient behaviour) is associated with outcome.

Overall, there was some discrepancy as to the extent of the relationship between MI and purported mechanisms and few studies were found to examine Link 2 and Link 3, or provide formal tests of mediation. However, some variables (e.g., patient change talk and therapist use of MI inconsistent behaviour²) did behave in a manner that was consistent

with MI theory, and were suggested as potential mechanisms of change in MI for substance use disorders (Apodaca & Longabaugh, 2009).

Apodaca and Longabaugh's (2009) research offers a framework for the investigation of potential MI mechanisms and the findings provide insight as to the types of mechanisms that have been examined in the MI literature. However, the review only examined studies in the field of substance use. There was no elucidation of the mechanisms of change in MI in other populations. The growing application of MI to a variety of mental health problems calls for an examination of mechanisms of change in this area. While MI was not originally intended as a stand-alone intervention for substance use, research has demonstrated the capacity for MI to engender behaviour change in its own right (Miller & Rollnick, 2002). As such MI is often used as a stand-alone treatment for substance use disorders to reduce substance use and improve symptoms. However, in the treatment of psychological disorders such as anxiety and eating disorders, MI is primarily used as an adjunctive treatment with an aim to enhance treatment gains as a result of another treatment. In these areas, employing MI is thought to facilitate patient motivation and engagement in other treatment (e.g., cognitive behavioural treatment; CBT), thereby potentially yielding more positive outcomes (Westra, Aviram, & Doell, 2011). Given that the focus of MI may differ across populations it is possible that the mechanisms of change in MI for substance use disorders may not apply when MI is used for other disorders. There is some evidence that factors such as change talk and MI consistent behaviours are related to treatment outcome in problem gamblers and patients wishing to improve their diet and physical activity (Hodgins, Ching, & McEwen, 2009; Pirlott, Kisbu-Sakarya, Defrancesco, Elliot, & Mackinnon, 2012), however the relevance of MI change mechanisms to the treatment of psychopathological disorders such as anxiety and eating disorders remains to be examined. Given that MI is related to improved treatment outcomes in these diverse mental health populations (Westra et al., 2011), uncovering the mechanisms that contribute to the success of MI treatment may help to tailor MI to specific patient concerns and potentially increase positive therapeutic outcomes.

The purpose of this review is to draw together research that examines MI mechanisms of change in patients diagnosed with mood, anxiety, psychotic, and eating disorders, and patients with comorbid conditions. The review aims to comprehend the spectrum and scope of the research in these areas and also to assess the consistency of the effect of MI mechanisms across a range of conditions. Guided by the purported mechanisms of change examined by Apodaca and Longabaugh (2009) the review focuses on the following mechanisms: patient behaviours (motivation, confidence, engagement, resistance, and experience of discrepancy) and therapist behaviours (MI consistent and inconsistent conduct, MI spirit and empathy). Following Apodaca and Longabaugh's causal model of MI, the following research questions were pursued: What is the effect of MI compared to other treatment modalities on proposed change mechanisms in MI (both therapist and patient behaviours)?; is there a relationship between therapist behaviours and patient behaviours in MI?; and; is there a relationship between proposed change mechanisms in MI and patient outcome, and what is the extent of this relationship?

¹ MI spirit is the relational style emphasised in MI that is characterised by respect for the patient's autonomy, collaboration between patient and therapist, and evocation of the patient's own motivation to change (Miller & Rollnick, 2013).

² Therapist use of MI-inconsistent behaviour was less likely to occur in MI, was negatively related to patient engagement and was consistently related to worse outcome (Apodaca & Longabaugh, 2009).

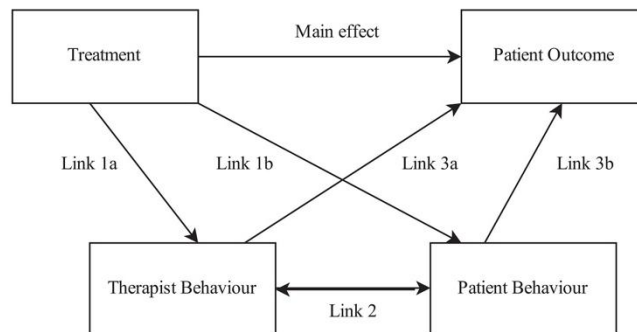


Fig. 1. Causal model linking MI, mechanisms of change, and outcome adapted from Apodaca and Longabaugh (2009).

2. Method

2.1. Inclusion criteria

Studies were included if they met the following criteria: (i) Participants received a therapeutic intervention referred to as 'motivational interviewing', 'motivational enhancement', 'motivational intervention' or 'brief intervention' and was described by the authors as being based upon the principles of Motivational Interviewing (Miller & Rollnick, 1991, 2002, 2013); (ii) participants had symptoms that met diagnostic criteria for a mood, anxiety, psychotic or eating disorder according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., DSM-IV-TR; American Psychiatric Association, 2000); (iii) if participants concurrently met DSM-IV criteria for a substance use disorder, substance use was not the primary target of the intervention, rather, the target was the comorbid condition; (iv) the potential change mechanism was measured either during or after the intervention (in the case of therapeutic mechanisms, e.g., therapist empathy, patient attendance) or before and after the intervention (to assess change in patient variables, e.g., motivation); (v) the study provided sufficient data for effect size calculation, or data was available from study authors; (vi) studies were reported in English. No publication status restrictions were imposed in the current review.

In order to identify MI research that met these criteria multiple search methods were employed. An electronic database search of PsycINFO, Embase, Web of Science, Sage, Scopus, ProQuest Dissertations and Theses, and Google Scholar was conducted using the following keywords: motivational interviewing, motivational enhancement therapy, brief intervention, mechanisms of action, mediator, moderator, and therapy process. Hand-searches of the online MI bibliography posted on the MI website (<http://www.motivationalinterview.org>) were also conducted, as well as hand-searches of relevant commentaries, review, and meta-analytic papers (Apodaca & Longabaugh, 2009; Burke, 2011; Flynn, 2011; Geller & Dunn, 2011; Simpson & Zuckoff, 2011; Westra et al., 2011). Database searches were conducted up until March 2013. The search retrieved 425 studies of which 20 met the inclusion criteria. Fig. 2 presents the search outcomes and progression of studies throughout the review. The authors respected the PRISMA statement (Moher et al., 2009) in the preparation of this review.

2.2. Study characteristics

For each study, sample characteristics were recorded, including sample size, participant age and gender, diagnosis, and sample source. Characteristics of the MI intervention and study methodology were also recorded, including the method of data collection, comparison

condition, and treatment effect.³ Study characteristics are presented in Table 1. Methodological quality scores for each study were determined using a modified version of the criteria defined by Moncrieff, Churchill, Drummond, and McGuire (2006), with additional items drawn from Burke, Arkowitz, and Menchola (2003). Methodological quality scores for the included studies ranged from 15 to 32 out of a possible 40, with a mean score of 25.45 ($sd = 5.27$). A random 25% of the studies were double coded by an independent rater. The intraclass correlation coefficient for the absolute agreement between the two raters ranged from .80 to .94, suggesting good reliability for the quality scoring system. The quality scoring system and study quality scores are available upon request from the first author.

2.3. Effect size calculation

Effect sizes were estimated for each study that provided appropriate information for calculation. Ten study authors were contacted to obtain further information for effect size calculation; four supplied additional information. All effect sizes were calculated based on formulae derived from Lipsey and Wilson (2001). Mean weighted effect sizes and analyses of heterogeneity and publication bias described below were conducted using Comprehensive Meta-Analysis Version 2 (Borenstein, Hedges, Higgins, & Rothstein, 2005).

Studies using multiple measures of the same construct or those that assessed the construct at multiple time-points were dealt with in two ways: first, if sufficient data were available for each measure, an effect size was calculated for all measures of the construct and then an average effect size was determined⁴; second, if adequate data were not provided for all measures, the effect size for the study was calculated based on the measure which allowed for the most valid estimation of effect size.

2.4. Effect size calculations for Link 1

Two methods were employed to calculate effect sizes for Link 1. First, for variables that were measured pre and post treatment, a standardised mean gain effect size (d) was calculated (Becker, 1988). A d for mean gain shows the effect of condition (i.e., MI or Control) on change in the proposed mechanism from pre to post. In order to calculate d for mean gain, the correlation between pre-treatment and post-treatment measurement of the variable is required. Generally, the data needed to

³ Although the focus of this review was not to assess the effectiveness of treatment on symptom reduction, information about treatment effects was gathered in order to test Link 3.

⁴ A supplementary table that reports all individual effect size estimates used to calculate an average effect size is available upon request from the first author.

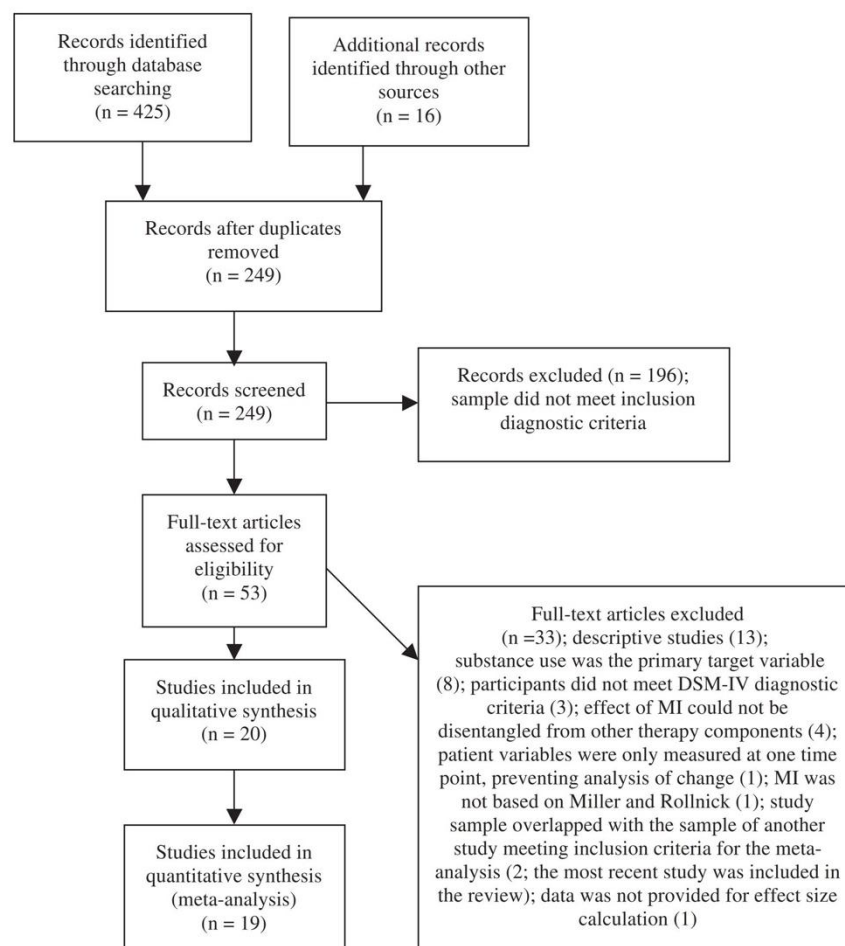


Fig. 2. Search outcomes and progression of studies throughout the review. Adapted from The PRISMA Group (Moher, Liberati, Tetzlaff, & Altman, 2009).

calculate a pre/post correlation is not provided in research articles, thus effect sizes may be estimated based on an average correlation computed using studies that have provided sufficient information (Morris & DeShon, 2002). Correlations were required to calculate effect sizes for patient motivation and confidence. Three studies provided enough information to calculate a pre/post correlation for change in motivation (Dunn et al., 2006; Feld et al., 2001; Murphy et al., 2009).⁵ Since relatively few studies contributed to the average, a sensitivity analysis was conducted to compare effect sizes calculated using the average correlation

($r = 0.86$) versus those based on an arbitrary and more conservative correlation of $r = 0.5$ and results did not differ. Given that only one study provided sufficient information to calculate a pre/post correlation for patient confidence (Feld et al., 2001) a correlation of 0.5 was utilised. Second, for Link 1 studies that did not examine pre to post changes, an unadjusted standardised mean difference (d) was calculated. In this case the value for d represents the difference between the MI and control condition on the change mechanism at one time-point only (either at post or in-treatment assessment). The convention for appraising the magnitude of the effect size d (both adjusted and unadjusted) given by Cohen (1977, 1988) was adopted: $ES \leq .20$ (Small); $ES = .50$ (Medium); $ES \geq .80$ (Large).

2.5. Effect size calculations for Link 2 and Link 3

Effect sizes for Links 2 and 3 were calculated in the form of the correlation coefficient, r , providing an estimate of the relationship between two variables. Here, two relationships were examined: the relationship

⁵ The average pre/post correlation for change in motivation was based on Dunn et al. (2006) and Feld et al. (2001) as these studies utilised the University of Rhode Island Change Assessment Scale (URICA; a measure of motivation common to other studies included in the review). The correlations calculated from Murphy et al. (2009) were not used to calculate the average correlation because they were inconsistent across questionnaire items and the measure of motivation was idiosyncratic and specific to the study design.

between therapist behaviour and patient behaviour (Link 2) and the relationship between the purported mechanism (therapist or patient behaviour) and treatment outcome (Link 3). For Link 3, the effect size was calculated for the sample as a whole (MI and control groups combined); however, if data were available, separate effect sizes for intervention and control groups are also displayed. To appraise the magnitude of the correlation coefficient effect size (r) the convention established by Cohen (1988) was employed; $ES \leq .10$ (Small); $ES = .25$ (Medium); $ES \geq .40$ (Large).

2.6. Mean weighted effect sizes

A mean weighted effect size for each mechanism of change was determined using inverse variance methodology. If a study examined a change mechanism but did not provide data for effect size calculation, the study was not included in the meta-analysis. A more conservative method involves imputing an effect size of zero for studies with inadequate data (Lipsey & Wilson, 2001), however this method was not employed due to the exploratory nature of the review. For Link 1, d effect sizes were corrected to adjust for the potential of small sample bias according to procedures suggested by Hedges and Olkin (1985; Hedges' g). The difference in effect sizes computed as d or Hedges' g were minimal and did not affect significance, thus the effect size d is presented in the results. For Links 2 and 3, all correlation coefficient effect estimates were z transformed for analyses and returned to the r metric for reporting purposes. Summary effect sizes were calculated using a random effects model. Random effects meta-analysis allows for a more robust estimation of effect size when true variation in effect size is expected to exist between studies.

2.7. Heterogeneity

To assess homogeneity of the pooled effect sizes, the Cochrane Q statistic and the I^2 index were examined (Higgins & Thompson, 2002). The Q statistic yields low power in the presence of few studies, thus a p value of >0.10 indicated adequate homogeneity. I^2 values of 25%, 50%, and 75% reflected respectively, low, medium, and high variance due to heterogeneity (Higgins & Green, 2011). If the Q and I^2 statistics suggested the existence of residual heterogeneity, subgroup analyses were conducted to determine whether pooled effect sizes varied as a function of study characteristics. Two variables thought to predict the magnitude of the pooled effect sizes were participant clinical diagnosis and study comparison condition. Subgroup analyses were conducted using a mixed effect model, whereby the variance is computed within subgroups and not pooled across subgroups.

2.8. Sensitivity and publication bias

Sensitivity ("leave-one-out") analyses were performed to determine the impact of each study on the given meta-analytic findings. Publication bias was assessed through examination of publication bias funnel plots and Duval and Tweedie's (2000) trim and fill procedure. If asymmetry was evident in the funnel plot as suggested by Egger's regression test (Egger, Smith, Schneider, & Minder, 1997), Duval and Tweedie's trim and fill procedure was applied. The trim and fill procedure provides an adjusted effect size that corrects for the number of missing studies, and specifies on the funnel plot the location of the missing studies. Since relatively few studies were available for each meta-analysis, sensitivity analyses and analysis of publication bias were only conducted for those meta-analyses that included five or more studies (i.e., motivation, attendance, and in-session engagement). For the sake of brevity only instances of significant heterogeneity and publication bias are detailed in the results. Study authors may be contacted for full details of analyses.

3. Results and discussion

3.1. Study characteristics

There were 20 studies included in the review. The majority of studies were conducted in treatment seeking populations with diagnoses of either anxiety or eating disorders. The participants were mainly female (65.2%) with an average age of 33.25 ($sd = 1.05$). Most studies employed MI in conjunction with another treatment (80%) and implemented three to four sessions of MI, each lasting approximately one hour (65% studies). When MI was a stand-alone intervention, it was used to enhance further treatment uptake or outpatient appointment attendance (three studies) or to improve community health service utilisation (one study). Only three studies utilised active treatment control conditions. All studies provided enough information for the calculation of at least one effect size, although due to differences in study design not all effect sizes could be combined meta-analytically.⁶

Link 1 was the most widely examined, with the majority of studies assessing the impact of a motivational intervention on patient engagement and change in motivation. Individual effect size estimates for Link 1b (patient variables) ranged from $d = -1.07$ to $d = 1.45$. Individual effect sizes for Link 1a (therapist variables) ranged from $d = -0.31$ to $d = 1.83$. LaPietra (2006) was the only study to examine Link 2 by assessing the relationship between therapist empathy and change in patient motivation, however no data were provided for effect size calculation. All studies that examined Link 3 assessed the relationship between patient variables and outcome, with individual effect sizes ranging from $r = -0.02$ to $r = 0.63$. Individual effect sizes and mean weighted effect sizes for each change mechanism are presented in Table 2. Pooled effect sizes for each link in Apodaca and Longabaugh's (2009) conceptual model are presented in Fig. 3. Positive effect sizes are consistent, and negative findings inconsistent, with MI theory. Results for each mechanism of change will now be examined.

3.2. Patient motivation

MI resulted in greater increases in patient motivation when compared to a minimal control condition in seven of the 12 studies. In the only study to employ an active treatment control condition, MI patients failed to show a greater increase in motivation (Treasure et al., 1999). The largest effect size for the studies examining motivation as a proposed mechanism was found for an anxiety-disordered population (Westra & Dozois, 2006). The mean weighted effect size for the effect of MI on patient motivation was small, non-significant ($d = 0.18$, 95% CI $[-0.05$ to $0.42]$, $p = 0.125$), but homogenous. For exploratory purposes, summary effect sizes were calculated with participant diagnosis as a categorical moderator variable. A significant and medium sized effect was found for diagnoses of anxiety, mood, and psychotic disorders ($n = 5$) ($d = 0.45$, 95% CI $[0.13$ to $0.78]$, $p = 0.007$) and a very small, negative, and non-significant effect for eating disorder diagnoses ($n = 5$) ($d = -0.01$, 95% CI $[-0.28$ to $0.25]$, $p = 0.916$). Given that an underlying aim of MI is to enhance motivation to change it is surprising that so few studies found a positive effect for MI. However, the results are similar to those found by Apodaca and Longabaugh (2009) in substance using populations. Results for Link 3b were consistent in suggesting that increases in patient motivation are related to better outcome, in both an anxiety disordered (Westra & Dozois, 2006) and an eating disordered population (Wade et al., 2009). The mean weighted effect size was large and significant ($r = .52$, 95% CI $[0.35$ to $0.66]$,

⁶ The study by Feld et al. (2001) was a single group pre-post design and thus was not included in any meta-analysis, however individual effect sizes for this study are reported. Some studies examined variables of interest but only provided data that controlled for covariates. Individual effect sizes were calculated for these studies, however as the effect sizes were based on adjusted data they were not combined meta-analytically. Details of covariate adjusted effect sizes are provided in the tables of results.

Table 1
Study characteristics.

Study	Link examined	n	Population	Diagnosis	Treatment effect (outcome measure)	MI (Session length)	Mechanism (measure)	Comparison condition
Aviram and Westra (2011)	1, 3	35	Volunteers	CAD	Yes (PSWQ)	Pre CBT Individual 4, 50 min	Resistance (CRC); engagement (HW)	NPT; CBT
Bewell-Weiss (2010)	1	41	Tx seeking	AN	No (EDE-Q; BDI-II)	Add-on Individual 4, 30 min	Motivation (MTC)	Waitlist (patient could continue to receive TAU)
Buckner and Schmidt (2009)	1	27	Volunteers	EDNOS SAD	NA	Stand-alone Individual 3, 3.5 h in total	Engagement (attendance)	Assessment + psycho-education
Dean, Touyz, Rieger, and Thornton (2008)	1	42	Tx seeking	AN	No (EDI-2, EDE-Q, BDI-II)	Add-on Group 4, 1.25 min	Motivation (ANSOCQ); confidence (SES); engagement (TEQ)	TAU (inpatient unit)
Dunn, Neighbors, and Larimer (2006)	1	90	Volunteers	BN	Yes (EDDS – binge abstinence)	Add-on Individual 1, 45 min	Motivation (BRTC)	Self-help manual
Erbach-Wilson (2011)	1	76	Tx seeking	EDNOS BED	No (EDE-Q)	MI discharge interview Individual 1, 30 min	Engagement (appointment attendance)	Routine discharge with aftercare brochure
Feld, Woodside, Kaplan, Olmsted, and Carter (2001)	1	19	Tx seeking	AN	Yes (BDI; RSES; EDI)	Stand-alone Group 4, 1 h	Motivation (URICA)	None
Hsieh et al. (2012)	1	27	Tx seeking	EDNOS TBI + anxiety disorder ^b	No (EDE-Q; EDI)	Pre-CBT Individual 3, 50 min	Engagement (treatment completion)	Non-directive counselling; TAU
Humfress et al. (2002)	1	90	Tx seeking	Various diagnoses ^c	Yes (HADS/DASS – Anxiety; DASS – Stress) No (HADS/DASS – Depression)	Stand-alone Individual 1, not specified	Motivation (URICA); empathy/collaboration (patient ratings)	Standard psychiatric interview
LaPietra (2006)	1	59	Tx seeking	Dual diagnoses ^d	NA	Stand-alone Individual 1, 45 min	Motivation (URICA); engagement (attendance)	Educational video; retrospective control group
Katzman et al. (2010)	1	225	Tx seeking	BN	No (SEED)	Pre-CBT Individual 4, 50 min	Engagement (treatment completion)	Individual CBT + group CBT; individual MET + group CBT; individual MET + individual CBT
Maitby and Tolin (2005)	1	12	Tx seeking	EDNOS OCD	NA	Add-on Individual 4, not specified	Motivation (URICA); confidence (ERF); engagement (completing EX/RP)	Waitlist

Author	Year	Sample size	Study design	Diagnoses	NA	Add-on	Engagement (punctuality)	Standard admission interview
Martino, Carroll, O'Malley, and Rounsaville (2000)	1	23	Tx seeking	Dual diagnoses ^c	NA	Individual 1. 45–60 min		
Murphy, Thompson, Murray, Rainey, and Uddo (2009)	1	115	Tx seeking	PTSD	NA	Add-on Group 4, 1.5 h	Motivation (TPEQ); engagement (WAI; attendance)	Psycho-education
Simpson et al. (2010)	1	25	Tx seeking	OCD	No (Y-BOCS; HAM-D; Q-LES-Q)	Add-on Individual	Engagement (PEAS; treatment completion); MI spirit (MITI)	EX/RP alone
Swanson, Pantalon, and Cohen (1999)	1	121	Tx seeking	Dual diagnoses ^f	NA	MI used throughout EXRP Add-on Individual 1, 1 h	Engagement (attendance)	Standard treatment
Treasure, Karzman, Schmidt, Troop, and de Silva (1999)	1, 3	142	Tx seeking	BN	No (Thx/Patient ED symptom ratings) Yes/no (EDE-Q) ^h	Pre-CBT Individual 4, not specified	Motivation (URICA); engagement (WAI)	CBT
Wade, Frayne, Edwards, Robertson, and Gilchrist (2009)	1, 3	47	Tx seeking	AN		Add-on Individual 4, 1 h	Motivation (ANSOCQ); confidence (single item)	TAU
Westra and Dozois (2006)	1, 3	55	Tx seeking	Anxiety disorders ^g	Yes (ASI; FNER; PSWQ; BDI-II)	Pre-CBT Individual 3, 1 h	Motivation (ACES); engagement (HW; treatment completion)	NPT
Westra et al. (2009)	1, 3	76	Volunteers	GAD	Yes (PSWQ) No (DASS; CGI; SDS)	Pre-CBT Individual 4, 50 min	Motivation (ACES); engagement (HW)	NPT

Note. Tx = Treatment; GAD = Generalised anxiety disorder; AN = Anorexia nervosa; BN = Bulimia nervosa; EDNOS = Eating disorder not otherwise specified; SAD = Social anxiety disorder; BED = Binge eating disorder; TBI = Traumatic brain injury; OCD = Obsessive compulsive disorder; PTSD = Post-traumatic stress disorder; PSQW = Penn State Worry Questionnaire; EDE-Q = Eating Disorder Examination Questionnaire; BDI = Beck Depression Inventory; EDI = Eating Disorder Inventory; EDOS = Eating Disorder Diagnostic Scale; RSES = Rosenberg Self-Esteem Scale; HADS = Hospital Anxiety and Depression Scale; DASS = Depression, Anxiety and Stress Scales; GASS = Global Assessment of Functioning; SEED = Short Evaluation of Eating Disorders; Y-BOCS = Yale-Brown Obsessive-Compulsive Scale; HAM-D = Hamilton Depression Rating Scale; Q-LES-Q = Quality of Life and Enjoyment Questionnaire; ASI = Anxiety Sensitivity Index; FNEB = Fear of Negative Evaluation Scale; CGI = Clinical Global Impression Scale; SDS = Sheehan Disability Scale; CBT = Cognitive Behaviour therapy; CRT = Client resistance code; HW = Homework compliance; MTC = Motivation to change scale; ANSOCC = Anorexia nervosa stages of change questionnaire; SES = Self-efficacy scale for anorexia; TEQ = Treatment engagement questionnaire; BRIC = Binge-eating readiness to change scale; URICA = University of Rhode Island change assessment scale; ERP = Expectancies rating form; EX/REP = Exposure and response prevention; TPEQ = Treatment programme and evaluation questionnaire; WAI = Working alliance inventory; PEAS = Patient EX/REP adherence scale; MITI = Motivational interviewing treatment integrity scale; ACES = Anxiety change expectancy scale; Thx = Therapist; NPT = No pre-treatment; TAU = Treatment as usual; MET = Motivational enhancement therapy. Tx effect: NA = Not reported in the study or statistical analyses not viable due to small sample; yes = MI condition yielded better outcomes than the comparison condition; no = MI condition yielded equal or worse outcomes than the comparison condition.

^a Diagnoses included: anxiety, mood, and depressive disorders not otherwise specified, depression and bipolar disorder with psychosis, alcohol abuse/dependence, and polysubstance dependence.

^b Anxiety diagnoses; GAD, OCD, Specific phobia, SAD, Panic disorder with agoraphobia, PTSD, and anxiety disorder not otherwise specified.

^c Diagnoses included: mood, neurotic and stress related disorders, eating disorders, primary substance misuse, and psychotic disorders.

^d Diagnoses included: depressive disorder, bipolar or other psychotic disorder, concurrent with substance abuse/dependence (substances included heroin, opiates, cocaine, alcohol, and cannabis).

^e Diagnoses included: substance use or dependence (alcohol, cocaine, opioid, cannabis, anxiolytic, amphetamine) alongside concurrent mood disorder (dysthymia, major depression, depressive disorder not otherwise specified), or psychotic disorder (schizoaffective disorder, paranoid schizophrenia, undifferentiated schizophrenia, schizopreniform disorder, psychotic disorder not otherwise specified).

^f Diagnoses included: schizophrenia, psychotic disorder, schizoaffective disorder, affective disorder, substance-induced depressive disorder.

^g Anxiety diagnoses; panic disorder with/without agoraphobia, SAD, and GAD.

^h No differences were found between baseline and 2 week follow-up, however the total EDE score for the MI group continued to decrease between 2 and 6 week follow up, whereas it increased for the TAU group.

ⁱ Pre-CBT = MI was administered prior to entering CBT treatment. Add-on = MI was administered as an adjunct to other treatment, either prior to or following treatment, or during treatment as determined by patient necessity. Stand-alone = MI was the only intervention received.

Table 2
Effect size estimates.

Construct	Treatment–mediator	Mediator–outcome
Study	Link 1 (ES = <i>d</i> or <i>d</i> for mean gain ^a)	Link 3 (ES = <i>r</i>)
Patient motivation		
Bewell-Weiss (2010)	–0.11 ^{avg}	
Buckner and Schmidt (2009) ^b	0.08 ^{avg}	
Dean et al. (2008)	–0.18 ^{avg}	
Dunn et al. (2006)	0.21 ^{avg}	
Feld et al. (2001) ^b	0.37 ^{avg}	
Humfress et al. (2002)	–	
LaPietra (2006)	0.88 ^{avg}	
Maltby and Tolin (2005)	–0.09 ^{avg}	
Martino et al. (2000)	–	
Murphy et al. (2009)	0.47	
Treasure et al. (1999)	–0.28 ^{avg}	
Wade et al. (2009)	–0.12	
MET		0.50 ^{avg}
TAU		0.63 ^{avg}
Both conditions		0.57 ^{avg}
Westra and Dozois (2006)	0.83	
MI		0.34
NPT		0.59
Both conditions		0.49 ^{avg}
Westra et al. (2009)	0.03 ^{avg}	
Moderate severity	–0.30	
High severity	0.36	
Mean weighted ES ^c	0.18	0.52 ^{**}
Mean weight ES by diagnosis		
Eating disorders	–0.01	
Other diagnoses ^d	0.45 [*]	
Patient confidence		
Bewell-Weiss (2010)	–0.38	
Buckner and Schmidt (2009) ^e	0.64	
Dean et al. (2008)	0.05	
Feld et al. (2001) ^e	0.72	
Maltby and Tolin (2005)	0.85	
Wade et al. (2009) ^e	–0.08 ^{avg}	
Mean weighted ES	0.04	
Attendance		
Bewell-Weiss (2010)	0.73	
Buckner and Schmidt (2009)	1.22	
Dean et al. (2008)	0.55 ^{avg}	
Erbach-Wilson (2011)	1.36	
Hsieh et al. (2012)	–1.07	
Katzman et al. (2010)	0.08	
LaPietra (2006)	–0.28	
Maltby and Tolin (2005)	0.76	
Martino et al. (2000)	0.93 ^{avg}	
Murphy et al. (2009)	0.43 ^{avg}	
Simpson et al. (2010)	–0.90	
Swanson et al. (1999)	0.66	
Treasure et al. (1999)	–0.26	
Wade et al. (2009)	–0.34	
Westra and Dozois (2006)	0.61	
Westra et al. (2009)	0.42	
Mean weighted ES	0.38 [*]	
Mean weighted ES by diagnosis		
Eating disorders	0.08	
Other diagnoses ^f	0.54 ^{**}	
Mean weight ES by comparison condition		
Minimal	0.55 ^{**}	
Active	–0.13	
In-session engagement		
Aviram and Westra (2011)	0.71	0.24 ^{avg}
Dean et al. (2008) ^g	0.02	
Dunn et al. (2006)	–	
Humfress et al. (2002)	–	
Murphy et al. (2009)	0.47	
Simpson et al. (2010)	0.19	
Treasure et al. (1999)	–0.05	0.31 ^{avg}
Westra and Dozois (2006)	0.97	0.34 ^{avg}
Westra et al. (2009)	0.42	
MI		–0.02
NPT		0.39
Both conditions		0.20 ^{avg}

Table 2 (continued)

Construct	Treatment–mediator	Mediator–outcome
Study	Link 1 (ES = <i>d</i> or <i>d</i> for mean gain ^a)	Link 3 (ES = <i>r</i>)
Mean weighted ES	0.42 ^{**}	0.27 ^{**}
Patient resistance ^h		
Aviram and Westra (2011)		
vs NPT	1.45	MI 0.12
vs CBT	1	NPT 0.56
		Both conditions 0.55
Therapist behaviours		
Humfress et al. (2002)		
Empathy	0.20 ^{avg}	
Collaboration	0.30 ^{avg}	
Simpson et al. (2010)		
Empathy	1.63 ^{avg}	
Collaboration	1.56 ^{avg}	
Evocation	1.83 ^{avg}	
Autonomy	1.56 ^{avg}	
Direction	–0.31 ^{avg}	
MI spirit overall	1.30 ^{avg}	
Mean weighted ES for empathy	0.87	
Mean weighted ES for collaboration	1	
Mean weighted ES for MI spirit overall	0.71	

Note. For mean weighted effect sizes (ES), * indicates $p < 0.05$; ** indicates $p < 0.01$. avg Indicates studies that included more than one measurement of the same construct or examined multiple time-points or diagnostic severity. – Indicates that the study tested this path, but did not provide information required to calculate an ES estimate. MET = Motivational Enhancement Therapy; TAU = Treatment as usual; MI = Motivational Interviewing; and NPT = No Pre-treatment.

^a Mean gain ES's presented for motivation and confidence are based on a pre/post correlation of 0.5.

^b Studies that were not included in the calculation of the mean weighted ES for motivation; Buckner and Schmidt (2009), the individual ES is based on descriptive statistics that controlled for a covariate (employment status); Feld et al. (2001), the study utilised a heterogeneous design (single group pre-post) so inclusion in the mean weighted ES was unjustified.

^c The mean weighted ES presented included the average ES calculated for Westra et al. (2009).

^d Other diagnoses included: panic disorder with/without agoraphobia, social anxiety disorder, generalised anxiety disorder, obsessive compulsive disorder, post-traumatic stress disorder, or depressive disorder, bipolar or other psychotic disorder, concurrent with substance abuse/dependence (substances included heroin, opiates, cocaine, alcohol, and cannabis).

^e Studies that were not included in the calculation of the mean weighted ES for confidence; Buckner and Schmidt (2009), Feld et al. (2001), Wade et al. (2009), the ES is based on estimated marginal means.

^f Other disorders included those mentioned above and: specific phobia, anxiety disorder not otherwise specified, substance use or dependence (alcohol, cocaine, opioid, cannabis, anxiolytic, amphetamine, and heroin) alongside concurrent mood disorder (dysthymia, major depression, depressive disorder not otherwise specified, bipolar), or psychotic disorder (schizophrenia, schizoaffective disorder, paranoid schizophrenia, schizophreniform disorder, psychotic disorder not otherwise specified), and substance-induced depressive disorder.

^g The ES for Dean et al. (2008) was not included in the calculation of the mean-weighted ES for in-session engagement as it is based on data which controlled for pre-test engagement scores.

^h Positive effect sizes for patient resistance indicate that more resistance during treatment was related to worse outcome.

$p < 0.001$). Two studies aimed to test the role of patient motivation as a mediator, however non-significant preliminary analyses precluded formal tests of mediation (Bewell-Weiss, 2010; Dunn et al., 2006).⁷

⁷ The current review examined how change in motivation during MI relates to outcome. We did not calculate effect sizes if only one measure of motivation was assessed (i.e., baseline or post-MI motivation). However, higher baseline motivation was associated with improvements in eating disorder symptoms (Katzman et al., 2010; Treasure et al., 1999), and higher post-MI motivation was related to lower scores on measures of depression and eating disorder symptomatology (Bewell-Weiss, 2010). Bewell-Weiss (2010) also found pre and post-MI motivation to significantly predict treatment completion.

3.3. Patient confidence

Two out of five studies demonstrated that patient confidence increased more in MI than it did in a minimal control condition (Buckner & Schmidt, 2009; Maltby & Tolin, 2005). The pooled effect size ($n = 3$) was negligible and non significant ($d = 0.04$, 95% CI $[-0.54$ to $0.62]$, $p = 0.888$), but homogenous. In line with Apodaca and Longabaugh (2009), the effect sizes for individual studies provided mixed support for MI in improving patient confidence.

3.4. Patient engagement

Engagement in MI relates to the interpersonal process of “establishing a mutually trusting and respectful helping relationship” (Miller & Rollnick, 2013, p. 40). Indications of patient engagement can include involvement and self-exploration, attendance at therapy sessions, completion of homework tasks, and compliance with the treatment regime (Miller & Rollnick, 2013). Conceptualisation and measurement of engagement across studies was diverse. Working alliance⁸ was found to be the variable most closely aligned with Miller and Rollnick’s formulation of engagement. For exploratory purposes more common indicators of engagement typically utilised in psychotherapy research (for example, attendance, homework compliance, and treatment adherence) (Tetley, Jinks, Huband, & Howells, 2011) were examined. Due to the heterogeneity of measurement of engagement, two categories of engagement were formed and studies with similar measurements of engagement were combined meta-analytically. Category 1: attendance and treatment completion (which also included attending outpatient appointments and therapy following the treatment study); and; Category 2: in-session engagement (this comprised of measures utilised to assess engagement during treatment, that is; homework compliance, working alliance, and compliance with treatment regimes).

3.5. Attendance

The majority of studies (11/16 studies) found that participants in an MI condition attended more treatment than those in a control condition. The mean weighted effect size also favoured MI ($d = 0.38$, 95% CI $[0.08$ to $0.67]$, $p = 0.012$), though demonstrated significant heterogeneity ($Q = 43.92$, $p < .001$, $I^2 = 65.85$). When including diagnosis as a moderator variable, studies conducted with eating disordered participants ($n = 5$) achieved a mean weighted effect size of $d = 0.08$, 95% CI $[-0.27$ to $0.42]$, which was non-significant ($p = 0.652$), while studies conducted with anxiety, mood, and psychotically disordered participants ($n = 11$) garnered a medium effect size ($d = 0.54$, 95% CI $[0.18$ to $0.90]$, $p = 0.003$). Examining the effect sizes by diagnosis improved the heterogeneity for eating disorders ($Q = 7.06$, $p = 0.133$, $I^2 = 43.30$), however significant heterogeneity still existed for anxiety, mood, and psychotic disorders ($Q = 23.68$, $p = 0.009$, $I^2 = 57.77$). Mean weighted effect sizes were then pooled by comparison condition. Analyses were conducted for two subgroups: non-active/“treatment as usual” (TAU) control conditions: ($n = 13$) ($d = 0.55$, 95% CI $[0.25$ to $0.85]$, $p < .001$); and active treatment control conditions: ($n = 3$) ($d = -0.13$, 95% CI $[-0.50$ to $0.25]$, $p = 0.504$). While the pooled effect size for active treatments was homogenous ($Q = 2.93$, $p = 0.232$, $I^2 = 31.63$), the effect size for minimal control conditions still demonstrated some heterogeneity ($Q = 25.01$, $p = 0.015$, $I^2 = 52.03$).

3.6. In-session engagement

In six of the seven studies that examined in-session engagement, MI was shown to have a positive effect compared to control conditions, for

example higher ratings on homework compliance (Aviram & Westra, 2011; Westra & Dozois, 2006; Westra et al., 2009) and measures of working alliance (Murphy et al., 2009). The meta-analysis demonstrated a small to medium effect size in favour of MI ($d = 0.42$, 95% CI $[0.16$ to $0.68]$, $p = 0.002$). Examination of the funnel plot and Egger’s regression suggested funnel plot symmetry ($t = 0.62$, $df = 11$, $p = 0.568$), however inspection of the funnel plot adjusted for missing studies indicated one study was trimmed from the analysis. The Duval and Tweedie trim and fill procedure recommended an adjusted d of 0.35 (95% CI $[0.07$ to $0.63]$). All Link 3 studies showed that greater levels of in-session engagement were associated with more positive outcomes (Aviram & Westra, 2011; Treasure et al., 1999; Westra & Dozois, 2006; Westra et al., 2009) and the pooled effect size was significant ($r = 0.27$, 95% CI $[0.14$ to $0.39]$, $p < 0.001$), and homogenous. One study supported the role of homework compliance as a mediator of the effect of condition (MI vs. no pre-treatment [NPT]) on worry reduction (Westra et al., 2009).

The effect sizes found for engagement variables coincide with those found in substance using populations, whereby, MI was related to greater patient involvement and engagement had a small positive effect on outcome (Apodaca & Longabaugh, 2009). One divergence from the Apodaca and Longabaugh review is that measurement of engagement in the substance use literature was more in line with Miller and Rollnick’s definition, for example, observation of specific patient behaviours like involvement and disclosure. Nevertheless it is promising that MI also appears to have a positive effect on other indicators of patient engagement such as attendance and homework compliance. However, subgroup analyses suggest that MI is no better at enhancing treatment attendance in comparison to active treatments or in the presence of eating disorders.

3.7. Patient resistance

A single study examined patient resistance (“any behaviour which opposes, blocks, diverts, or impedes the direction set by the therapist”; Aviram & Westra, 2011). Anxious participants who received MI prior to CBT showed less resistance during CBT than those who did not receive a pre-treatment. When compared to CBT, MI also achieved a positive effect on resistance. In relation to Link 3, participants who showed less resistance achieved greater worry reduction and were also more likely to comply with CBT homework demands (Aviram & Westra, 2011). Furthermore, participant resistance mediated the relationship between treatment group (MI vs. NPT) and worry reduction. The results for both Link 1 and Link 3b mirror those found by Apodaca and Longabaugh in that MI relates to less resistance and less resistance corresponds with better patient outcome. Analogous to research in the substance use domain, the role of resistance as a mediator of change is understudied.

3.8. Therapist MI spirit/empathy

Effect sizes indicated that therapist MI spirit behaviours (e.g., empathy, collaboration, evocation, and autonomy) occurred more often in MI than they did in the comparison condition (two studies). One exception was for therapist direction, which was found to occur less in MI (Simpson et al., 2010). The mean weighted effect size was large ($d = 0.71$, 95% CI $[-0.30$ to $1.72]$), though non-significant ($p = 0.167$), and demonstrated significant heterogeneity ($Q = 4.72$, $p = 0.030$, $I^2 = 78.81$). Therapist use of a relational style that is consistent with the principles of MI does appear to distinguish MI from control conditions. However, therapist variables in MI, both relational style variables and specific therapist behaviour’s are currently understudied in the reviewed populations. Nevertheless, qualitative findings highlight the value of therapist style in facilitating positive patient responses to therapy. For example, participants consistently rated therapist empathy and use of active listening as the most favoured aspects of the session (Dunn et al., 2006) and commented that the empathic and non-confrontational style of the therapists indicated

⁸ Typical measures of working alliance require patients and therapists to rate items that assess their agreement about therapeutic tasks (Task), therapeutic bond (Bond) and therapeutic goals (Goal) (Bordin, 1979).

that the treatment team acknowledged their struggle with recovery (Dean et al., 2008). Also, anecdotal evidence from therapists suggested that participants who attended MI groups were more willing to engage in discussions about change (Dean et al., 2008), which supports the role of MI in facilitating the change process. Moreover, quantitative findings demonstrated that participants who completed MI were more willing to partake in CBT and were more open to therapist contact (Buckner & Schmidt, 2009). While these data were not included in effect size calculation, the findings further support the positive effect of MI on engaging patients in active treatment.

3.9. An overall perspective

The present review aimed to examine potential MI change mechanisms in populations affected by mood and anxiety disorders, eating disorders, psychotic disorders, and comorbid conditions. The review investigated these mechanisms by incorporating a conceptual framework provided by Apodaca and Longabaugh (2009). Coinciding with Apodaca and Longabaugh's review of the substance use domain, there was a lack of evidence for many of the links (Shown in Figure 1) in these populations. Furthermore, similar to findings from Apodaca and Longabaugh (2009), nearly all of the reviewed studies examined only one link in the causal chain and mediation was rarely tested. Nevertheless there was some evidence for the role of homework compliance and patient resistance as mediators of the effect of MI on treatment outcome (Aviram & Westra, 2011; Westra et al., 2009). Also, the pooled effect sizes for each link in the causal model (Shown in Fig. 3) provide some evidence that supports MI theory. Overall the application of MI appears to be related to the presence of both therapist and patient behaviours (Link 1a and 1b) and patient behaviours are predictive of treatment outcome (Link 3b). Unfortunately, the relationship between therapist and patient behaviours during MI was not examined in the reviewed studies, nor was the link between therapist variables and outcome.

In evaluating specific variables that could contribute to the process of MI, some appear to have more of a role than others. MI does appear to contribute to greater attendance and in-session engagement during MI, and higher levels of in-session engagement (particularly homework compliance) are related to subsequent outcome. A primary purpose of using MI to treat psychological disorders, such as anxiety and eating disorders, is to improve patient engagement with their usual treatment programmes with a view to enhance treatment outcome (Westra et al., 2011). In line with this view the findings are promising as they indicate some potential for MI to enhance current treatment for these disorders, particularly by way of increasing engagement, at least in the

case of mood, anxiety, and psychotic disorders. However, there are two caveats to the findings. The first is that treatment attendance and in-session engagement were no better for eating disordered patients who received an MI intervention than for those in a control condition. While the results may relate to study methodology it is possible that the adjunctive use of MI in the treatment of eating disorders does not provide the same benefits as in other populations. Given the difficulty associated with the treatment of eating disorders (Geller & Dunn, 2011) perhaps receiving a relatively brief add-on treatment is not enough to enhance engagement with the more active treatment components. Also, some patients, for example those who are low in motivation or forced into treatment, may need more time to resolve ambivalence and establish a positive working alliance with the therapist. This interpretation of the results for engagement overlaps with the findings for patient motivation, whereby those patients with eating disorder diagnoses who received MI did not show more positive shifts in motivation. Considering the relative stubbornness associated with the treatment of eating disorders, it may be more difficult to increase patient motivation. Patients with anxiety disorders are often quite motivated to change but the fear of treatment itself may impede the change process (Slagle & Gray, 2007). Perhaps, simply attending a preparatory MI treatment is beneficial in reducing a fear of the treatment process. In contrast, eating disordered patients may hold more entrenched concerns about the costs and benefits of relinquishing disordered eating patterns that could require more time to overcome. The second caveat is the extensive use of minimal control conditions by the reviewed studies. Minimal control conditions do not allow inferences to be made about the effect of MI in particular but rather that some type of pre-treatment or adjunctive therapy may affect patient engagement and motivation more so than no additional therapy. Furthermore, similar to the findings of Apodaca and Longabaugh (2009), those studies that did compare MI to active treatment control conditions generally found that MI was not related to increased attendance or motivation, which refutes the idea that MI plays a unique role in improving these patient factors. Interestingly, there was also a difference in the relationship between patient variables (i.e., motivation and homework compliance) and treatment outcome across conditions, with larger effect sizes found for the control groups (Wade et al., 2009; Westra & Dozois, 2006; Westra et al., 2009). In order to establish change mechanisms that are distinct to MI, the variable should account for more of a relationship in MI than in other conditions (Apodaca & Longabaugh, 2009). The use of active control groups will aid in elucidating the relevance of these variables to MI specifically, or to psychotherapy treatment in general.

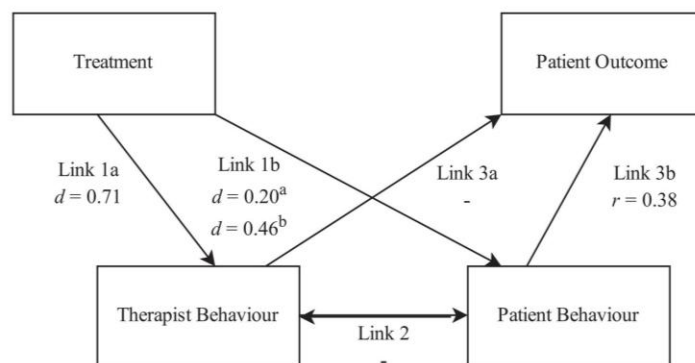


Fig. 3. Pooled effect sizes for each link in causal model. Note. Adjusted and unadjusted effect sizes for Link 1b have been pooled separately (as suggested by Lipsey and Wilson (2001)).
^aEffect size *d* for mean gain (motivation and confidence studies). ^bEffect size *d* (engagement and resistance studies).

3.10. Limitations

A major limitation of the current review is that there were too few studies to allow for reliable estimations of mean weighted effect sizes. Furthermore, many of the studies that did contribute to the meta-analyses yielded small sample sizes and methodological quality of the studies was often poor. It was also the case that residual heterogeneity still existed once accounting for study level moderators, particularly in the case of patient attendance. Moreover, given the limited number of studies, moderator analyses do not reliably reflect the presence or lack of a “true” study level effect and thus findings should be interpreted with caution. One methodological limitation of the included studies was the use of minimal control conditions and relatively ambiguous TAU control groups. In many studies it was unclear as to what TAU actually entailed, which makes it difficult to draw conclusions about the types of treatments over which MI achieves greater effects on potential change mechanisms. In a similar vein, although the inclusion criteria specified that MI interventions aligned with the principles of Miller and Rollnick (1991, 2002, 2013), it is likely that there was variability in the content of MI treatments. It is possible to evaluate the quality of MI received by participants, however, only five studies used a validated MI fidelity measure. Without MI fidelity measures it is difficult to reliably comment on the process of MI because it is unclear if participants received “pure” MI as described by Miller and Rollnick, or if they received an assortment of behaviour change techniques. Similarly, using MI in combination with other treatments makes investigating change mechanisms more challenging, particularly because it is difficult to disentangle the effect of MI from the effects of other treatment components.

A further limitation relates to effect size calculation. Often studies did not present enough information to calculate accurate effect sizes (e.g., pre/post correlations were not provided in any study) or did not report findings for all measures. While efforts were made to attain desired information often inferences concerning the data were required, limiting the accuracy of the calculated effect sizes and affecting the reliability of the results. A final limitation is the potential for publication bias. While there did not appear to be evidence of publication bias as per Egger’s test, the small sample may have limited the power of this test to provide an accurate representation of potential bias. However, one advantage of this review is the inclusion of dissertation theses, which may have provided a broader field of research findings, significant or not.

3.11. Future directions

Given the rapid dissemination of MI in the treatment of anxiety, mood, eating, and psychotic disorders, research examining potential mechanisms of change may provide insight into therapist and patient behaviours that should be emphasised during MI treatment in an effort to improve treatment outcome. At this point, there is a discrepancy between the mechanisms of change that have been examined in these populations and those reviewed by Apodaca and Longabaugh (2009). Particularly notable was that none of the reviewed studies investigated variables thought to be fundamental to MI’s therapeutic process, particularly, therapist MI consistent and inconsistent behaviours and patient change talk. MI theory implicates change talk as a unique mechanism of action, whereby therapist use of MI consistent behaviour (e.g., reflections and affirmations) facilitates patient change talk and it is this change talk that is related to positive treatment outcome (Miller & Rose, 2009). Current research in the field of substance abuse supports this causal model and also suggests that therapist use of MI-inconsistent behaviours (e.g., confrontation) impede the expression of change talk and relate to worse treatment outcome (Miller & Rose, 2009). While therapist behaviours and patient change talk have been examined in areas such as gambling (Hodgins et al., 2009) and diet and exercise (Pirlott et al., 2012), determining the relevance of these

mechanisms in the treatment of varied mental health problems is an avenue for future research that may be fruitful. In order to examine therapist and patient in-session behaviour, consistent use of MI fidelity measures is necessary. This will allow for a broader range of MI mechanisms to be examined and will ensure that MI quality benchmarks are reached. Observational measurement of therapist and patient variables will also allow for more reliable effect sizes to be garnered. In the current review much larger effect sizes were found for therapist behaviours when these behaviours were rated using an MI fidelity measure (Simpson et al., 2010) as opposed to patient ratings (Humfress et al., 2002), which may suggest some discrepancy due to measurement indices. The use of observational coding systems is vital to achieve objective data regarding patient and therapist behaviour, and the interaction between the two during MI treatment. Furthermore, this type of coding may provide a more accurate picture of patient engagement, which is relevant to the MI process specifically. There is a distinct lack of formal tests of mediation both within the current review and in the realm of MI process research more generally. Further examination of mediational models and experimental tests of MI elements will help to refine the understanding of MI theory and may improve the utilisation of MI in a variety of treatment domains.

3.12. Conclusions

There is a growing body of research to suggest that using MI as an adjunctive treatment can enhance patient outcome in a range of problem areas because it helps to motivate patients and engage them in their usual treatment programmes (Westra et al., 2011). However, in order to apply MI efficiently and effectively in diverse populations it is important to understand the mechanisms through which it enhances outcome. The current review has highlighted that research into the mechanisms of MI is limited in populations affected by anxiety, mood, eating, and psychotic disorders and there is a definite need to examine therapist behaviours and patient change talk in these areas. Research that investigates MI mechanisms can offer insight into treatment elements that should be emphasised in MI in order to enhance outcomes. At present, there is some support for the role of patient engagement as a potential mechanism through which MI may enhance the treatment of diverse mental health problems.

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Contributors

Both authors contributed to study design and methodology. Mia Romano conducted literature searches, data extraction and analyses, and prepared the first draft of the manuscript. Both authors contributed to and have approved the final manuscript.

Conflict of Interest

The authors have no conflicts of interest to disclose.

References^a

- ^aAviram, A., & Westra, H. A. (2011). The impact of motivational interviewing on resistance in cognitive behavioural therapy for generalized anxiety disorder. *Psychotherapy Research*, 21, 698–708. <http://dx.doi.org/10.1080/10503307.2011.610832>.
- ^aBewell-Weiss, C. V. (2010). *A brief motivational interviewing intervention as a prelude to intensive eating disorder treatment*. (Doctoral Dissertation) (Retrieved from ProQuest Dissertations and Theses Database (UMI No. NR68341)).
- ^aBuckner, J. D., & Schmidt, N. B. (2009). A randomized pilot study of motivation enhancement therapy to increase utilization of cognitive-behavioral therapy for social anxiety. *Behaviour Research and Therapy*, 47, 710–715. <http://dx.doi.org/10.1016/j.brat.2009.04.009>.
- ^aDean, H. Y., Touyz, S. W., Rieger, E., & Thornton, C. E. (2008). Group motivational enhancement therapy as an adjunct to inpatient treatment for eating disorders: A preliminary study. *European Eating Disorders Review*, 16, 256–267. <http://dx.doi.org/10.1002/erv.851>.

^a References marked with an asterisk indicate studies included in the review.

- *Dunn, E. C., Neighbors, C., & Larimer, M. E. (2006). Motivational enhancement therapy and self-help treatment for binge eaters. *Psychology of Addictive Behaviors*, 20, 44–52. <http://dx.doi.org/10.1037/0893-164X.20.1.44>.
- *Erbach-Wilson, K. M. (2011). *Predictors of adherence with aftercare services in adult psychiatric patients upon discharge*. (Doctoral Dissertation) ProQuest Dissertations and Theses.
- *Feld, R., Woodside, D. B., Kaplan, A. S., Olmsted, & Carter, J. C. (2001). Pretreatment motivational enhancement therapy for eating disorders: A pilot study. Presented in poster session at the Eating Disorder Research Society Meeting, November 1998, Boston, Massachusetts.
- *Hsieh, M. Y., Ponsford, J., Wong, D., Schonberger, M., Taffe, J., & McKay, A. (2012). Motivational interviewing and cognitive behaviour therapy for anxiety following traumatic brain injury: A pilot randomised controlled trial. *Neuropsychological Rehabilitation: An International Journal*, 22, 585–608. <http://dx.doi.org/10.1080/09602011.2012.678860>.
- *Humphress, H., Igel, V., Lamont, A., Tanner, M., Morgan, J., & Schmidt, U. (2002). The effect of a brief motivational intervention on community psychiatric patients' attitudes to their care, motivation to change, compliance and outcome: A case control study. *Journal of Mental Health*, 11, 155–166.
- *Katzman, M. A., Bara-Carril, N., Rabe-Hesketh, S., Schmidt, U., Troop, N., & Treasure, J. (2010). A randomized controlled two-stage trial in the treatment of bulimia nervosa, comparing CBT versus motivational enhancement in Phase 1 followed by group versus individual CBT in Phase 2. *Psychosomatic Medicine*, 72, 656–663. <http://dx.doi.org/10.1097/PSY.0b013e3181ec5373>.
- *LaPietra, E. H. (2006). *The impact of motivational interviewing on initial treatment attendance for participants with dual disorders*. (Doctoral Dissertation) (Retrieved from ProQuest Dissertations and Theses (UMI No. 3207481)).
- *Maltby, N., & Tolin, D. F. (2005). A brief motivational intervention for treatment-refusing OCD patients. *Cognitive Behaviour Therapy*, 34, 176–184. <http://dx.doi.org/10.1080/16506070510043741>.
- *Martino, S., Carroll, K. M., O'Malley, S. S., & Rounsaville, B. J. (2000). Motivational interviewing with psychiatrically ill substance abusing patients. *The American Journal on Addictions*, 9, 88–91.
- *Murphy, R. T., Thompson, K. E., Murray, Rainey, Q., & Uddo, M. M. (2009). Effect of a motivation enhancement intervention on veterans' engagement in PTSD treatment. *Psychological Services*, 6, 264–278. <http://dx.doi.org/10.1037/a0017577>.
- *Simpson, H. B., Zuckoff, A. M., Maher, M. J., Page, J. R., Franklin, M. E., Foa, E. B., et al. (2010). Challenges using motivational interviewing as an adjunct to exposure therapy for obsessive-compulsive disorder. *Behaviour Research and Therapy*, 48, 941–948. <http://dx.doi.org/10.1016/j.brat.2010.05.026>.
- *Swanson, A. J., Pantalon, M. V., & Cohen, K. R. (1999). Motivational interviewing and treatment adherence among psychiatric and dually diagnosed patients. *The Journal of Nervous and Mental Disease*, 187, 630–635.
- *Treasure, J. L., Katzman, M., Schmidt, U., Troop, G. T., & de Silva, P. (1999). Engagement and outcome in the treatment of bulimia nervosa: First phase of a sequential design comparing motivation enhancement therapy and cognitive behavioural therapy. *Behaviour Research and Therapy*, 37, 405–418. [http://dx.doi.org/10.1016/S0005-7967\(98\)00149-1](http://dx.doi.org/10.1016/S0005-7967(98)00149-1).
- *Wade, T. D., Frayne, A., Edwards, S. A., Robertson, T., & Gilchrist, P. (2009). Motivational change in an inpatient anorexia nervosa population and implications for treatment. *Australian and New Zealand Journal of Psychiatry*, 43, 235–243. <http://dx.doi.org/10.1080/00048670802653356>.
- *Westra, H. A., Arkowitz, H., & Dozois, D. J. (2009). Adding a motivational interviewing pretreatment to cognitive behavioral therapy for generalized anxiety disorder: A preliminary randomized controlled trial. *Journal of Anxiety Disorders*, 23, 1106–1117. <http://dx.doi.org/10.1016/j.janxdis.2009.07.014>.
- *Westra, H. A., & Dozois, D. J. A. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and Research*, 30, 481–498. <http://dx.doi.org/10.1007/s10608-006-9016-y>.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders. Text Revision* (4th ed.). Washington, DC: American Psychiatric Press.
- Apodaca, T. R., & Longabaugh, R. (2009). Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction*, 104, 705–715. <http://dx.doi.org/10.1111/j.1360-0443.2009.02527.x>.
- Becker, B. J. (1988). Synthesizing standardized mean-change measures. *British Journal of Mathematical and Statistical Psychology*, 41, 257–278.
- Bordin, E. S. (1979). The generalizability of the psychoanalytic concept of the working alliance. *Psychotherapy: Theory, Research and Practice*, 16, 252–260. <http://dx.doi.org/10.1037/h0085885>.
- Borenstein, M., Hedges, L., Higgins, J., & Rothstein, H. (2005). *Comprehensive meta-analysis version 2*. Englewood, NJ: Biostat.
- Burke, B. L. (2011). What can motivational interviewing do for you? *Cognitive and Behavioral Practice*, 18, 74–81. <http://dx.doi.org/10.1016/j.cbpra.2009.08.004>.
- Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology*, 71, 843–861. <http://dx.doi.org/10.1037/0022-006X.71.5.843>.
- Cassin, S. E., von Ranson, K. M., Heng, K., Brar, J., & Wojtowicz, A. E. (2008). Adapted motivational interviewing for women with binge eating disorder: a randomized controlled trial. *Psychology of Addictive Behaviors*, 22, 417–425. <http://dx.doi.org/10.1037/0893-164X.22.3.417>.
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences* (Rev. ed.). New York: Academic Press.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.
- Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, 56, 455–463. <http://dx.doi.org/10.1111/j.0006-341X.2000.00455.x>.
- Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, 315, 629–634.
- Flynn, H. A. (2011). Setting the stage for the integration of motivational interviewing with cognitive behavioral therapy in the treatment of depression. *Cognitive and Behavioral Practice*, 18, 46–54. <http://dx.doi.org/10.1016/j.cbpra.2009.09.006>.
- Geller, J., & Dunn, E. C. (2011). Integrating motivational interviewing and cognitive behavioral therapy in the treatment of eating disorders: Tailoring interventions to patient readiness for change. *Cognitive and Behavioral Practice*, 18, 5–15. <http://dx.doi.org/10.1016/j.cbpra.2009.05.005>.
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Orlando, FL: Academic Press.
- Higgins, J. P. T., & Green, S. (Eds.). (2011). *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]*. The Cochrane Collaboration (Available from www.cochrane-handbook.org).
- Higgins, J. P. T., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine*, 21, 1539–1558. <http://dx.doi.org/10.1002/sim.1186>.
- Hodgins, D. C., Ching, L. E., & McEwen, J. (2009). Strength of commitment language in motivational interviewing and gambling outcomes. *Psychology of Addictive Behaviors*, 23, 122–130. <http://dx.doi.org/10.1037/a0013010>.
- Lipsey, M. W., & Wilson, D. B. (Eds.). (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage Publications.
- Lundahl, B. W., Kunz, C., Brownell, C., Tollefson, D., & Burke, B. L. (2010). A meta-analysis of motivational interviewing: Twenty-five years of empirical studies. *Research on Social Work Practice*, 20, 137–160. <http://dx.doi.org/10.1177/1049731509347850>.
- Magill, M., Gaume, J., Apodaca, T. R., Walthers, J., Mastroiolo, N. R., Borsari, B., et al. (2014). The technical hypothesis of motivational interviewing: A meta-analysis of MI's key causal model. *Journal of Consulting and Clinical Psychology*. <http://dx.doi.org/10.1037/a0036833> (Advance online publication).
- Martino, S., Carroll, K. M., Nich, C., & Rounsaville, B. J. (2006). A randomized controlled pilot study of motivational interviewing for patients with psychotic and drug use disorders. *Addiction*, 101, 1479–1492. <http://dx.doi.org/10.1111/j.1360-0443.2006.01554.x>.
- Martins, R. K., & McNeil, D. W. (2009). Review of motivational interviewing in promoting health behaviors. *Clinical Psychology Review*, 29, 283–293. <http://dx.doi.org/10.1016/j.cpr.2009.02.001>.
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behaviour*. New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York: Guilford Press.
- Miller, W. R., & Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist*, 64, 527–537. <http://dx.doi.org/10.1037/a0016830>.
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and metaanalyses: The PRISMA statement. *PLoS Medicine*, 6, 1–6.
- Moncrieff, J., Churchill, R., Drummond, D. C., & McGuire, H. (2006). Development of a quality assessment instrument for trials of treatments for depression and neurosis. *International Journal of Methods in Psychiatric Research*, 10, 126–133.
- Morris, S. B., & DeShon, R. P. (2002). Combining effect size estimates in meta-analysis with repeated measures and independent-groups designs. *Psychological Methods*, 7, 105–125. <http://dx.doi.org/10.1037/1082-989X.7.1.105>.
- Pirlott, A. G., Kisbu-Sakarya, Y., Defrancesco, C. A., Elliot, D. L., & Mackinnon, D. P. (2012). Mechanisms of motivational interviewing in health promotion: A Bayesian mediation analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 69. <http://dx.doi.org/10.1186/1479-5868-9-69>.
- Simpson, H. B., & Zuckoff, A. (2011). Using motivational interviewing to enhance treatment outcome in people with obsessive-compulsive disorder. *Cognitive and Behavioral Practice*, 18, 28–37. <http://dx.doi.org/10.1016/j.cbpra.2009.06.009>.
- Slagle, D. M., & Gray, M. J. (2007). The utility of motivational interviewing as an adjunct to exposure therapy in the treatment of anxiety disorders. *Professional Psychology: Research and Practice*, 38, 329–337. <http://dx.doi.org/10.1037/0735-7028.38.4.329>.
- Steinberg, M. L., Ziedonis, D. M., Krejci, J. A., & Brandon, T. H. (2004). Motivational interviewing with personalized feedback: A brief intervention for motivating smokers with schizophrenia to seek treatment for tobacco dependence. *Journal of Consulting and Clinical Psychology*, 72, 723–728. <http://dx.doi.org/10.1037/0022-006X.72.4.723>.
- Tetley, A., Jinks, M., Huband, N., & Howells, K. (2011). A systematic review of measures of therapeutic engagement in psychosocial and psychological treatment. *Journal of Clinical Psychology*, 67, 927–941. <http://dx.doi.org/10.1002/jclp.20811>.
- Westra, H. A., Aviram, A., & Doell, F. K. (2011). Extending motivational interviewing to the treatment of major mental health problems: Current directions and evidence. *The Canadian Journal of Psychiatry*, 56, 643–650.

Following the publication of Chapter Three, further studies have been published that contribute to the literature on MI mechanisms in the context of psychiatric conditions. This section briefly outlines the results of such research.

All but one study was conducted with anxious participants and overall the results support those of the meta-analysis, suggesting that MI may improve treatment engagement in anxious populations. For example, adolescents with mood and anxiety disorders randomized to an MI pre-treatment before group cognitive behavioral therapy (CBT) attended significantly more group sessions and showed greater treatment initiation compared to those participants in the control condition (Dean, Britt, Bell, Stanley, & Collings, 2016). Similarly, Barrera, Smith, and Norton (2015) found that an MI pre-treatment (as opposed to no pre-treatment) prior to transdiagnostic CBT for anxiety disorders was related to greater treatment initiation and treatment attendance, and participants in the MI condition were more likely to be categorized as treatment completers. No differences were found between groups for homework compliance, though there was a trend to suggest higher participant rated homework compliance for cognitive restructuring. The results for motivation variables were less consistent, with one study demonstrating that MI participants showed greater readiness for change following MI (Dean et al., 2016) and another not showing any changes in motivation or ambivalence following MI, though MI participants did report greater expectancies for anxiety reduction one year following treatment (Barrera et al., 2015). However, in the one study conducted with participants diagnosed with full or sub-threshold binge eating disorder or non-purging bulimia, MI was associated with increases in readiness and eating self-efficacy, whereas the psychoeducation control condition was not (Vella-Zarb, Mills, Westra, Carter, & Keating, 2014).

One randomized controlled trial was particularly pertinent to the state of research

examining the effect of MI for generalized anxiety disorder (GAD) and also in examining MI processes. Westra, Constantino, and Antony (2016) examined the effect of integrative MI-CBT versus CBT alone for clients with severe GAD. Overall, the trial found that though differences between groups were not apparent at the post-treatment follow-up period, MI-CBT clients demonstrated a greater rate of improvement over follow-up, continuing to improve after treatment ended and showing significantly higher rates of recovery and clinically significant change, in terms of assessor diagnosis and self-reported worry and distress, respectively. In terms of MI treatment ingredients, there were significantly higher ratings of empathy and MI Spirit in the MI-CBT group, and in terms of engagement, MI-CBT participants were less likely to drop-out (an effect which approached significance).

Theoretically important MI mechanisms were also examined in separate papers using the trial sample, including client ambivalence and resistance, and therapist empathy. Client ambivalence, as operationalized by client counter-change talk (CCT; language that maintains the status quo) was found to be an important predictor of outcome. A particularly notable finding was that the effect of ambivalence on outcome was moderated by treatment type, whereby clients with higher early ambivalence showed significantly better long-term outcomes and continued improvements over time if they received MI-CBT. Whereas clients who received CBT alone showed slippage of gains over time after treatment ended. On the other hand, clients with lower levels of ambivalence appeared to have slightly better outcomes if they received CBT alone, an effect found to be marginally significant (Button, Westra, Constantino, & Antony, 2015). Constantino, Westra, and Antony (2015) further examined MI mechanisms by testing client resistance and empathy as mediators of change. Overall there appeared to be less client resistance and more therapist empathy in the MI-CBT condition, with more client resistance predicting worse outcome and more therapist empathy predicting better outcome. Resistance was found to mediate the effect of treatment on outcome, though empathy, homework compliance, and therapeutic alliance did not. Multiple mediator models

were also examined, where paths between treatment to resistance to homework compliance/therapeutic alliance to outcome were examined, though these were non-significant. One further study arising out of this treatment trial examined the impact of an MI-style on client resistance and worry outcome. The results showed that clients whose therapists used an MI style during moments of resistance in CBT had lower levels of post-treatment worry and subsequent resistance (Aviram, Westra, Constantino, & Antony, 2016).

Overall, the results of this new research support findings of the meta-analysis in terms of engagement and resistance and also demonstrated that therapist and client language in the context of MI may be relevant predictors of treatment outcome in the anxiety disorders. Furthermore, the positive effect of MI on engagement and motivation might also extend to non-clinical populations. For example, undergraduate students at-risk for anxiety disorders (high in anxiety sensitivity) who received motivational enhancement therapy for anxiety sensitivity compared to a healthy behaviors program showed greater motivation on multiple measures of motivation and were significantly more likely to complete a preventative intervention for anxiety sensitivity (Korte & Schmidt, 2015).

In general the findings of the published review and the additional studies demonstrated support for potential MI mechanisms particularly in the context of anxiety disorders, however there was limited use of active control conditions in the reviewed studies so it is difficult to draw conclusions about the effect of MI specifically. Also, at the time of the review no studies had yet examined elements of the MI causal model proposed by Miller and Rose (2009), or the role of client ambivalence. Therefore the final three papers of this thesis aimed to address the gap in research empirically by examining MI processes in the context of anxiety disorders, and specifically social anxiety disorder (SAD). The following chapter entitled “The role of ambivalence in MI-CBT for social anxiety disorder” aims to explore ambivalence in the context of an MI-style pre-treatment for SAD. Specifically the study aims to extend findings

of Chapter Two and Chapter Three on MI mechanisms and also to overcome an
aforementioned limitation of past research by comparing MI to an active control condition

References

- Aviram, A., Westra, H. A., Constantino, M. J., & Antony, M. M. (2016). Responsive management of early resistance in cognitive-behavioral therapy for generalized anxiety disorder. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000100
- Barrera, T. L., Smith, A. H., & Norton, P. J. (2015). Motivational interviewing as an adjunct to cognitive behavioral therapy for anxiety. *Journal of Clinical Psychology*, 0, 1-10. doi: 10.1002/jclp.22239
- Button, M. L., Westra, H. A., Constantino, M. J., & Antony, M. M. (2015). *Client motivation as a moderator of treatment outcomes in MI-CBT for generalized anxiety*. In H. A. Westra and M. J. Constantino (Moderators), An allegiance controlled RCT of MI-CBT for generalized anxiety. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.
- Constantino, M. J., Westra, H. A., & Antony M. M (2015). *Mediators of treatment effects in a randomized controlled trial testing the efficacy of augmenting CBT with motivational interviewing for severe generalized anxiety disorder*. In H. A. Westra and M. J. Constantino (Moderators), An allegiance controlled RCT of MI-CBT for generalized anxiety. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.
- Dean, S., Britt, E., Bell, E., Stanley, J., & Collings S. (2016). Motivational interviewing to enhance adolescent mental health treatment engagement: a randomized clinical trial. *Psychological Medicine*, 5, 1-9. doi:10.1017/S0033291716000568
- Korte, K. J., & Schmidt, N. B. (2015). The use of motivation enhancement therapy to increase utilization of a preventative intervention for anxiety sensitivity. *Cognitive Therapy and Research*, 39, 520 – 530. doi: 10.1007/s10608-014-9668-y

- Miller, W. R., & Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist*, 64, 527–537. doi:10.1037/a0016830
- Vella-Zarb, R. A., Mills, J. S., Westra, H. A., Carter, J. C., & Keating, L. (2014). A randomized controlled trial of motivational interviewing + self-help versus psychoeducation + self-help for binge eating. *International Journal of Eating Disorders*, 48, 328 – 332. doi: 10.1002/eat.22242
- Westra, H. A., Constantino, M. J., & Antony M. M (2016). Integrating motivational interviewing with cognitive-behavioral therapy for severe generalized anxiety disorder: An allegiance-controlled randomized clinical trial. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000098

Chapter 4

The role of ambivalence in MI-CBT for social anxiety disorder

This chapter has been prepared for submission to Cognitive Behavior Therapy.

Author contribution:

Ms. Mia Romano was solely responsible for the design of the research, analysis and write-up of this paper. Dr. Peters provided statistical and research supervision

The role of ambivalence in MI-CBT for social anxiety disorder.

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Abstract

One reason that Motivational Interviewing (MI) is thought to translate well to a variety of treatment domains is due to the focus on client ambivalence. Therefore the current study aimed to explore the construct of ambivalence in the context of adjunctive MI and cognitive behavioral therapy (CBT) for social anxiety disorder (SAD). Participants were 147 clients diagnosed with SAD who were randomized to receive either an MI-style pre-treatment or a supportive counseling control condition prior to all receiving group CBT for SAD. The results provided mixed support for the relationship between MI and ambivalence in a socially anxious population. MI was not shown to decrease ambivalence, either general ambivalence, treatment ambivalence, or ambivalence related to specific CBT tasks, however the condition to which participants were allocated did moderate the effect of some measures of baseline ambivalence on treatment outcome, and higher CBT task-related ambivalence was related to higher social anxiety symptoms during the CBT program. The findings suggest that while MI might not decrease ambivalence in this context, it may alleviate a negative effect of ambivalence on treatment outcome for SAD. Furthermore, there may be a need to integrate MI principles throughout CBT in order to combat ambivalence relating to specific CBT techniques.

Keywords: motivational interviewing; ambivalence; social anxiety

Motivational interviewing (MI) is a client-centered therapy style that was originally developed to help problem drinkers prepare for behavior change. Given this population is notoriously resistant to behavior change, MI was conceived as a mechanism for improving motivation and increasing the likelihood that problem drinkers would enter and engage in treatment to change their behavior, with the expectation that the benefits of typical substance use treatments would be enhanced (Miller & Rollnick, 2004). Following success of MI in improving treatment engagement for substance users (Burke, Arkowitz, & Menchola, 2003; Hettema, Steele, & Miller, 2005), there is a growing application for the adjunctive use of MI in treating a range of mental health concerns, for example anxiety disorders. While effective treatments exist for anxiety disorders, many clients drop out of treatment or do not receive optimal treatment gains, thus MI may be of use in this area (Westra, Aviram, & Doell, 2011).

Research in the context of anxiety disorders has shown that participants who have received an MI intervention have shown increases in motivation (Westra & Dozois, 2006) and homework compliance (Aviram & Westra, 2011; Westra, Arkowitz, & Dozois, 2009; Westra & Dozois, 2006), and that such motivational enhancement strategies may be useful in increasing rates of treatment entry and initiation (Barrera, Smith, & Norton, 2015; Buckner & Schmidt, 2009) and improving outcome (Westra, Constantino, & Antony, 2016; Westra & Dozois, 2006). Further research with anxious populations has shown that participants who received an MI intervention demonstrated less resistance either during the cognitive behavioral treatment (CBT) that followed or during adjunctive MI-CBT than those participants who did not receive MI (Aviram & Westra, 2011; Constantino, Westra, & Antony, 2015). Also, clients whose therapists used a MI style during moments of resistance in CBT had lower levels of post-treatment worry and subsequent resistance (Aviram, Westra, Constantino, & Antony, 2016).

While MI appears promising as an adjunctive treatment for anxiety disorders, not all studies have shown enhanced treatment engagement and outcomes, with most studies showing positive effects on some engagement variables and not others, or on some indices of treatment outcome and not others. For example, Barrera et al. (2015) found no differences in treatment outcome or treatment ambivalence, though did find some differences in CBT treatment initiation and expectations if participants received MI. Given such inconsistent results, a search for underlying mechanisms of MI in the treatment of anxiety disorders is important to begin to elucidate when MI is effective.

Research that aims to uncover MI mechanisms is becoming more prominent within the field of substance use and also health behaviors. A number of studies have provided evidence that client language is an important mechanism of MI, particularly that therapist behaviors affect client language during MI, and this language mediates the effect of MI treatment on outcome (Miller & Rose, 2009). However, while MI is increasingly used in the treatment of other mental health concerns, there is limited research on mechanisms of MI in these varying populations. A recent review examined MI mechanisms in populations diagnosed with mood, anxiety, and eating disorders (Romano & Peters, 2015, Chapter Three). One notable finding of the meta-analysis was that MI was related to higher levels of motivation in participants diagnosed with anxiety disorders as compared to those diagnosed with eating disorders. One study also showed that increased client motivation was linked to better treatment outcome for anxious clients (Westra & Dozois, 2006), though only two studies examined potential MI mechanisms as mediators of treatment outcome in this population (Aviram & Westra, 2011, Westra et al., 2009). Overall, there was limited use of active control conditions in the reviewed studies so it is difficult to draw conclusions about the effect of MI specifically. Also, the type of MI mechanisms that have been examined in anxiety populations was quite limited compared to those investigated in substance use populations (Romano & Peters, 2015,

Chapter Three), indicating that further research into MI mechanisms for anxiety could be helpful.

The current study focuses on a potential MI mechanism, namely, ambivalence towards change. One reason that MI is appealing in the treatment of a variety of mental health concerns is that it aims to directly address ambivalence towards change, which is a significant problem common to all treatment domains (Arkowitz, Miller, & Rollnick, 2015; Arkowitz, Westra, Miller, & Rollnick, 2008). In the context of MI, ambivalence refers to experiencing a tension between feelings of wanting to engage in behavior change but also wanting to stay the same (Miller & Rollnick, 1991, 2002, 2013). For example, in the case of anxiety concerns, a client may acknowledge the need to change their behavior due to the difficulties they experience, but on the other hand does not want to engage in treatment that forces them to confront their fears. Perhaps then, the increases in motivation and treatment engagement after MI demonstrated in some anxiety studies is due to a reduction in ambivalence towards change. Furthermore, given that MI theory conceptualizes resistant behaviors as outward expressions of ambivalence, it could be inferred that the decrease in resistance found by Aviram and Westra (2011) and Constantino et al. (2015) suggests that MI helped to resolve underlying ambivalence of anxious clients. It is surprising that while one of the main aims of MI is to resolve ambivalence, the ability of MI to actually decrease ambivalence (as opposed to increase motivation) has generally been overlooked. In anxious populations only one study has employed a measure of treatment ambivalence specifically (Barrera et al., 2015), and one study used client language as an indicator of ambivalence (Button, Westra, Constantino, & Antony, 2015). Though Barrera et al. did not find any decreases in ambivalence for the MI group, Button et al. found that participants who were highly ambivalent (used more language that maintained the status quo) had better long-term outcomes if they received MI-CBT and participants who were less ambivalent (less language that maintained the status quo) had better outcomes if they received CBT alone. Thus a more detailed look at the effect of MI on

ambivalence in the context of anxiety is warranted, particularly because it could be expected that MI-related reductions in ambivalence lead to better treatment outcome.

One issue that may be important to consider in examining ambivalence in the context of anxiety is the type of ambivalence experienced by anxious individuals. While substance users may recognize the negative impacts of problematic substance use, behavior change requires giving up a physically and mentally rewarding stimulus. Typically this dichotomy results in feelings of ambivalence. On the other hand, anxious individuals are often very motivated to change because anxious behaviors, thoughts, and feelings are distressing and interfere with functioning in a variety of domains. However, typical treatment for anxiety disorders (namely CBT) requires clients to expose themselves to situations that make them anxious and confront their fears. Thus ambivalence in the treatment of anxiety concerns may be likely to surface in relation to the methods used to achieve behavior change as opposed to the idea of behavior change itself (Slagle & Gray, 2007). One study in particular has demonstrated that individuals diagnosed with anxiety disorders have demonstrated concerns about the consequences of treatment (e.g., personality change) adverse reactions to treatment (e.g., anxiety symptoms might increase or relapse occur), and inconvenience of treatment (e.g., treatment might be embarrassing) (Rowa et al., 2014). Another point worth noting is that feelings of ambivalence may differ over time dependent on treatment structure, client characteristics, and how the client progresses throughout treatment. For example, while an MI pre-treatment might decrease ambivalence, as the client progresses through CBT they may encounter difficult tasks or roadblocks that cause the ambivalence to resurface. Also, there may be an interaction between anxiety and ambivalence during CBT in that as more difficult tasks are encountered, the client feels more anxious and ambivalence may increase as the cost (being anxious) begins to outweigh the benefits of improvement that the task provides.

Given preliminary evidence that MI is useful as an adjunctive treatment for anxiety and that the resolution of ambivalence to change is one of the main aims of MI therapy, a

more detailed examination of the ambivalence construct is warranted. No research to date has examined ambivalence in the context of MI treatment for social anxiety. Such research is needed, first and foremost, to establish whether MI helps to resolve ambivalence in this population. Research is also needed to determine how ambivalence relates to symptoms of anxiety and whether resolution of ambivalence is linked to treatment outcome. Elucidating what aspects of treatment or the client contribute to ambivalence may help to tailor treatment towards individual concerns and could improve treatment outcomes. Furthermore, only one study has compared MI to an active treatment control condition (Westra et al., 2016). Most of the aforementioned research in anxious populations has not controlled for the additional therapist/client contact that participants in MI conditions received, thus increased motivation and decreased resistance may be the result of this additional therapy time as opposed to the presence of MI specifically.

The aims of the current study are threefold; 1) First, to examine whether participants who receive MI show decreases in general ambivalence to change and in ambivalence towards CBT therapy specifically; 2) Second, to examine the relationship between ambivalence about specific elements of CBT therapy and client social anxiety; 3) and third, to assess whether ambivalence is related to treatment outcome following a group CBT program. Given the directive of MI to resolve ambivalence, it is expected that socially anxious participants randomized to receive MI will show greater changes in ambivalence than those participants randomized to a supportive counseling control condition. Higher levels of baseline ambivalence are expected to predict worse outcome in terms of social anxiety symptoms, with reductions in ambivalence expected to predict better treatment outcome. Finally, hypotheses relating to aim two are exploratory due to the novelty of this research question, however it is expected that anxiety symptoms during CBT and task-related ambivalence will be positively related.

Method

Sample and Procedures

Participants were 147 adults (72 female; age: 32.05 $M = (SD = 9.88)$) with a primary diagnosis of SAD who presented for treatment at the Centre for Emotional Health Clinic, Macquarie University, Sydney during 2012- 2015. Baseline demographic and symptom characteristics for the total sample and by treatment condition are presented in Table 1.

Participants were drawn from an ongoing randomized controlled trial that examined the effect of MI pre-treatment prior to commencing a CBT group program.² Participants contacted the Emotional Health Clinic during 2012-2015 through usual referral sources, including general practitioners, mental health professionals, occasional media coverage, and word of mouth. Telephone screening was conducted and those who emerged as potentially having anxiety-related difficulties were invited for a thorough assessment, which included the completion of questionnaires and a structured diagnostic interview (the Anxiety Disorders Interview Schedule – IV; ADIS-IV; Di Nardo, Brown, & Barlow, 1994) administered by graduate psychology students and clinical psychologists. All participants met inclusion criteria for the randomized controlled trial: they were over 18 years of age, had a primary diagnosis of SAD as measured by the ADIS–IV (Di Nardo et al., 1994), and a Clinician Severity Rating of symptoms of 4 or above on an 8-point scale (0 – *none* to 8 – *very severe*) (i.e., at least moderate impairment caused by SAD). Exclusion criteria were problems requiring immediate attention, such as, clear suicidal intent, severe substance abuse or dependence, and active psychosis. Concurrent pharmacotherapy was allowed, provided that dosages had been consistent for 3 months and there were no plans to change during the course of treatment.

² The sample for the current study represents 79% of the final sample analyzed for the randomized controlled trial.

All participants provided informed consent and the procedures were approved by the Macquarie University Human Research Ethics Committee.

Intervention. As part of the ongoing randomized controlled trial participants engaged in treatment conducted in two phases. Phase one was either an MI-style intervention (called Treatment Expectation and Engagement (TEE)) designed to prepare participants for CBT or supportive counseling (SC). Phase two was the CBT intervention (details of CBT intervention are reported elsewhere; Rapee, Gaston, & Abbott, 2009).

Phase one (TEE). Participants ($n = 66$) engaged in three one-hour sessions delivered individually by clinical psychologists or graduate clinical psychology students ($n = 12$). The sessions were designed as a preparatory treatment program to be conducted prior to CBT for SAD. The aim of the program was to address obstacles to full engagement with CBT for SAD, to enhance expectations about a positive outcome from CBT, and thereby, to enhance later outcomes from CBT. The TEE program extends some of the MI principles embodied in a program developed by Westra and Dozois (2008) to enhance engagement with treatment, but goes further to explicitly address expectations about CBT treatment for SAD. The TEE sessions involved discussion of: ambivalence and motivation; life values and the discrepancy between current behavior and those values; obstacles to change; expectations about treatment process and outcome; and, self-efficacy. The TEE program incorporated the MI principles of eliciting change talk, expressing empathy, developing discrepancy, rolling with resistance, and supporting self-efficacy described by Miller and Rollnick (2002). During the TEE sessions participants were invited to engage in treatment exercises that helped to elicit client costs and benefits of changing, identify values, and develop discrepancy. These elements were adapted from several sources including Forsyth and Eifert (2007) and Ciarrochi and Bailey (2008). Session One involved discussion of ambivalence and motivation and a cost-benefit analysis of remaining anxious vs. engaging in treatment; Session Two involved discussion of values and eliciting of values-behaviors discrepancy; and, Session Three

continued discussion of values-behavior discrepancy as well as detailed discussion of obstacles to and expectations for change, expectations of the treatment process, and boosting self-efficacy for change. All therapists carefully followed the manual-based protocol for the TEE sessions, with critical topics consistently introduced in the same order to all the clients. However in keeping with the client-centered spirit of MI, progression through session material was largely dependent on the client's engagement with the material.

Phase one (SC). Participants ($n = 81$) engaged in three one-hour sessions delivered individually by clinical psychologists or graduate clinical psychology students ($n = 14$). The sessions were designed to control for the number of hours of therapist contact received by the TEE condition. Therapists provided clients with the rationale that the SC sessions were intended for therapists to get an understanding of the client's life story and background before entering the CBT program. Therapists employed supportive counseling skills such as reflective listening and open-ended questions to engage the client in the sessions, but were proscribed from discussing client concerns about anxiety or the treatment program and from eliciting or reinforcing change language. If the client began to discuss anxiety-related concerns and change topics the therapist responded in a supportive manner but aimed to redirect the conversation to life history.

Phase two (CBT). After the three preparatory treatment sessions, participants engaged in group CBT for their social anxiety. CBT sessions were delivered and led by psychologists with expertise in these treatments. Groups made up of between 4 and 8 participants attended 3-hour treatment sessions delivered weekly over 12 weeks. Psychologists followed treatment protocols guided by manuals and participants received printed materials and handouts to support their learning. The efficacy of the CBT treatment protocol has been reported previously (Rapee et al., 2009). The CBT program components included modification of explicit beliefs through evidence-gathering, hypothesis testing and examination of core beliefs, training in redeployment of controlled attentional resources away from threat and onto

the task at hand, realistic appraisal and feedback of social performance, and in vivo exposure including elimination of safety behaviors and subtle avoidance.

Therapists. Therapists for Phase one and Phase two were final year post-graduate clinical psychology students and qualified clinical psychologists trained to deliver the TEE, SC, and CBT interventions. The CBT group was always lead by a qualified clinical psychologist, with a post-graduate psychology student to assist as co-therapist. Therapists had general training in clinical psychology and delivery of a range of psychological interventions, but did not have a specific allegiance to MI or CBT. Training in TEE, SC, and CBT consisted of viewing videotaped and live Phase one and Phase two therapy sessions, conducting initial sessions while being observed by a senior clinical psychologist who provided feedback, and weekly supervision by a senior clinical psychologist that was centered around adherence to the study protocol. The training procedures were designed to mimic those that might routinely occur in practice.

Materials

Condition Discrimination

Treatment credibility. Treatment credibility was assessed using a scale developed by Borkovec and Nau (1972). The measure is designed to assess both the credibility and the expectancy of improvement demonstrated by treatment rationales. Clients completed the measure following completion of Phase one (either TEE or SC).

Client Evaluation of Motivational Interviewing (CEMI; Madson, Bullock, Speed, & Hodges, 2009). The CEMI is a 16 item self-report measure aimed at assessing client perceptions of clinician use of MI. Participants rate the extent to which the MI therapist demonstrated each of 16 behaviors on a 4 point Likert scale (1 = *not at all* to 4 = *a great deal*). The CEMI has two factors, technical (eight items) and relationship (eight items). The

Technical factor comprises items to assess the extent to which clinician behaviors are consistent with discussing behavior change in an MI fashion. The relationship factor assesses relational factors, for example the use of confronting and directive behavior. Both factors have shown good internal consistency with Cronbach's alpha of .90, and .88, respectively (Madson et al., 2013). In the current study, internal consistency was also found to be high for the technical ($\alpha = .93$) and relational ($\alpha = .81$) factors. Participants completed the CEMI after Phase 1 (TEE or SC).

Therapist MI proficiency. To further distinguish between the TEE and SC groups 25% of sessions (TEE = 17 and SC = 20) were coded using the Motivational Interviewing Skill Code 2.5 (MISC 2.5; Houck, Moyers, Miller, Glynn, & Hallgren, 2013) and therapist MI proficiency was evaluated by comparing MISC codes against the Motivational Interviewing Treatment Integrity (MITI 3.1.1; Moyers, Martin, Manuel, Miller, & Ernst, 2010) recommended proficiency and competency standards for clinicians.³

Severity of Symptoms

Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). The SIAS is a 20-item scale that assesses the main fears and areas of avoidance in SAD. The SIAS has excellent psychometric properties (Peters, 2000). Participants completed the SIAS at the following time-points: prior to undertaking Phase one (TEE or SC); following completion of Phase One; 1-month following completion of Phase 2 (1-month follow-up) and; 6-months following completion of Phase 2 (6-month follow-up). For the current study, only baseline and follow-up assessment of anxiety symptoms (conducted at both 1-month and 6-months following completion of the CBT group protocol) were utilized.

SP-12 (Peters, Sunderland, Andrews, Rapee, & Mattick, 2012). The SP-12 is a 12-item measure that combines shortened forms of the SIAS and Social Phobia Scale (SPS;

³ The MISC 2.5 and MITI 3.1.1 are described in detail in Study Four and Five (Chapter Five and Six of the current thesis). Reliability of MISC behavior codes and global ratings are also detailed in Study Four and Five.

Mattick & Clark, 1998). The measure provides a relatively brief assessment of cognitive and behavioral symptoms of SAD compared to the original SIAS and SPS and thus was used to assess social anxiety symptoms during CBT each week. The SP-12 is highly correlated with scores on the original SIAS and SPS and also correlates with measures of depression and fear of negative evaluation (Peters et al., 2012). For the purposes of the current study SP-12 scores obtained at the start of CBT sessions 6, 7, 8, 9, 11, and 12 were utilized.

The Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995). The DASS is a 21-item measure that provides an assessment of general anxiety, stress, and depression. This measure has good psychometric properties and correlates with the Beck Depression Inventory and Beck Anxiety inventory (Lovibond & Lovibond, 1995). Participant scores on the DASS were assessed to control for these general symptoms in statistical analyses, therefore only pre-treatment DASS scores were used in the current study.

Ambivalence

Change Questionnaire (CQ; Brody, Arkowitz, & Allen, 2008). The CQ uses a decisional balance (DB) methodology to assess ambivalence for behavior change. This questionnaire improves upon existing measures of ambivalence by including items that tap the emotional components of ambivalence and is a standardized measure that is not restricted for use in specific problem areas. The CQ has two subscales, the first assesses the positives of change (P; 19 items) and the second assesses the negatives of change (C; 21 items). Each subscale requires the participants to think of a change they wish to make and rate the extent to which the positive and negative items apply to them on a 5-point scale (0 – *applies to me little or not at all* to 5 – *applies to me very much*). In order to create an ambivalence score the mean rating for all items in each subscale, P and C, is calculated and then the following formula is applied to calculate a total DB score:

$$DB = \frac{P + C}{2} - |P - C|$$

The resultant score is the final score, with higher numbers indicating greater levels of ambivalence. Brody et al. (2008) detailed the psychometric properties of the CQ, demonstrating high internal consistency for both subscales (Cronbach's $\alpha = .88$), with DB scores also significantly predicting responses to five change related questions (failures to change, mixed feelings, rumination, confidence, and commitment). In the current study Cronbach's alpha was also high for positive ($\alpha = .86$) and negative ($\alpha = .89$) subscales.

Treatment Ambivalence Questionnaire (TAQ; Rowa et al., 2014). The TAQ is a 26 item self-report measure that assesses treatment concerns about engaging in psychological treatment for anxiety disorders. The TAQ has three subscales; Personal Consequences of Treatment (13 items); Adverse Reactions to Treatment (8 items) and; Inconvenience of Treatment (5 items). Items are rated on a 7-point scale (1 – *strongly disagree* to 7 – *strongly agree*). Each subscale has shown good internal consistency: $\alpha = .90$; $\alpha = .88$ and; $\alpha = .80$, respectively, and factor analysis suggests that both the subscale scores and total scores of the TAQ are reliable (Rowa et al., 2014). In the current study, each subscale demonstrated good internal consistency: $\alpha = .86$; $\alpha = .85$ and; $\alpha = .73$, for Personal Consequences of Treatment, Adverse Reactions to Treatment, and Inconvenience of Treatment, respectively.

Participants' completed the CQ and TAQ prior to entering Phase 1 and following completion of Phase 1 (after three sessions of either TEE or SC).

CBT Task-related Ambivalence. Ambivalence relating to specific aspects of the CBT protocol was assessed using items developed for this study. Items were constructed to target the following aspects of treatment: behavioral experiments, anxiety surfing, letting go of safety behaviors, receiving feedback, and examining core beliefs. One item with two parts was created to assess ambivalence relating to each treatment component, for example: 1a) "Do you expect any personal benefits of participating in behavioral experiments?"; and 1b) "Do you expect any personal costs of participating in behavioral experiments?". Participants responded to the items by rating the extent to which they expected both personal benefits and

personal costs associated with specific aspects of CBT treatment on a 5-point scale (1 - *expect none* to 5 - *expect very many*). Each item was presented to participants on two occasions for each task depending on when the specific component of treatment had been introduced. This timing was employed to coincide with the structure of the treatment program, whereby the rationale for a treatment technique/skill was introduced in an initial session and then participants practiced the task either throughout the session or during homework assignments following the session. Therefore, the first rating corresponded to participant ambivalence about CBT skills after receiving psycho-education about the CBT skill, and the second rating corresponded to participant ambivalence about the CBT skill after actually attempting the skill (either during the session or for homework). In this way it was ensured that clients understood the treatment component that each item was addressing, and captured any ambivalence that may arise on learning the specific details of the treatment component and having to engage in tasks related to that treatment component. Participants provided ratings of ambivalence related to: the behavioral experiments and anxiety surfing components at Week 6 and 7; safety behaviors at week 7 and 8; behavioral experiments with feedback at week 8 and 9; and challenging core beliefs at week 11 and 12.⁴ Ambivalence for each task was calculated using the DB formula outlined in the CQ questionnaire scoring:

$$DB = \frac{P + C}{2} - |P - C|$$

Where P represents the benefits of the treatment component and C represents the costs of the treatment component. Higher DB scores represent greater ambivalence for the treatment component. A total in-session ambivalence score was calculated by averaging the total benefits ratings and the total costs ratings for all tasks and then applying the DB formula. Total in-session ambivalence and specific task related ambivalence showed significant positive correlations with pre-treatment scores on the TAQ (ranging from $r = .18$ to $r = .31$)

⁴ Ambivalence was not measured at week 10 because week 10 repeated session material previously rated for ambivalence.

and CQ scores (ranging from $r = .21$ to $r = .42$) suggesting that the purpose built measure demonstrated some construct validity.⁵

With the exception of in-session measures of social anxiety and ambivalence all questionnaire measures were completed online as part of a larger batch of questionnaires administered for the randomized controlled trial.

Analysis plan

In order to account for the hierarchical structure of the data, multilevel regression analyses were conducted in SPSS version 21. Multilevel modeling (MLM) analyses control for any non-independence of data that might arise from being nested into treatment groups and employs maximum likelihood estimation to more accurately estimate standard errors (Hedeker, Gibbons, & Flay, 1994; Herzog et al., 2002). Another advantage of MLM is that it can account for unequal group sizes and accommodates missing data (Raudenbush & Byrk, 2002).

Change in ambivalence from pre to post MI. Differences between treatments (TEE-CBT vs. SC-CBT) in changes in ambivalence were examined using multilevel mixed models containing a random intercept term as well as fixed effects for treatment received (Gibbons et al., 1993). The data structure comprised three levels, with repeated measures (i.e., the pre-post TEE/SC assessment points) at Level 1, nested within participants at Level 2, nested within group (i.e., each participant attended one of 22 groups) at the third level. Accounting for nesting within groups also accounts for therapist effects as each therapist was assigned to one of the 22 groups. Separate multilevel models were estimated for the TAQ, TAQ subscales, and the CQ questionnaire using restricted maximum likelihood estimation. Time and condition (SC-CBT = 0, TEE-CBT = 1) and the interaction between time and condition were

⁵ The correlation between TAQ and ambivalence about safety behaviors at week 8 was positive but non-significant. Correlations between ambivalence about anxiety surfing at week 7, feedback at week 8 and 9, and CQ scores were all positive but non-significant.

entered as fixed factors and participant and group and the interaction between participant and group were entered as random factors.

Predicting post treatment anxiety severity from ambivalence scores. A series of three-level regression models were evaluated to examine the relationship between ambivalence and anxiety severity after treatment (1-month post and 6-month follow-up time-points). Two separate models were estimated, one to analyze the effect of baseline CQ and TAQ scores, and the second to assess the effect of TAQ subscales specifically. If ambivalence scores are shown to change over time from baseline to post-TEE/SC, a third model will be estimated that accounts for this change. For all models, Level 1 consisted of repeated measures, nested within participants at level 2, nested within groups at the third level. The dependent variable was SIAS scores (baseline, post CBT, and 6-month follow-up). Ambivalence, DASS scores and condition (SC-CBT = 0, TEE-CBT = 1) were entered at the second level. Interaction terms between ambivalence and time, and ambivalence by condition were also entered. All predictors and covariates were entered as fixed effects and grand-mean centered. Participant and group and the interaction between participant and group were treated as random effects.

For all multilevel models, model fit statistics (-2 Restricted Log Likelihood (-2RLL)⁶) and ICC's were compared for the 2-level and 3-level models to determine the necessity of a third level. For analyses predicting SIAS outcome, fit statistics were also compared between models that included only a random intercept, and models that include both a random intercept and slope.⁷

CBT Task-related ambivalence. Independent sample t-tests were conducted to compare treatment groups on task-related ambivalence. To reduce the likelihood of making a

⁶ As only random components of the models were being compared, -2 Restricted Log Likelihood was utilized.

⁷ The Optimal Design computer program was utilized to calculate power for multilevel model analyses in the current study (Raudenbush et al., 2011). Given that the number of treatment groups in the study was fixed, the MDES approach was used. This approach computes the minimum effect size that can be detected at a particular level of power for a pre-specified sample size. With power set at .80, and the predicted intra-class correlation at the group level set at 0.10, a moderate effect size could be achieved with 22 groups.

Type 1 error as a result using multiple t-tests, significance was determined according to a Bonferroni adjusted p-value (.05/11). Preliminary analyses to evaluate the pattern of associations between CBT task-related ambivalence and social anxiety were conducted using bivariate correlations (Pearson r). To further examine the reciprocal relationships between task-related ambivalence and social anxiety during CBT a cross lagged panel analysis was conducted using structural equation modeling. The cross-lagged structural equation model is used to examine the relations of repeatedly measured constructs, with cross-lagged effects showing the effect of one construct on another measured at a later occasion (Selig & Little, 2012). Specifically, the cross-lagged structural equation model included ambivalence about the following CBT tasks: anxiety surfing (measured at week 6 and 7), behavioral experiments with feedback (measured at week 8 and 9), and challenging core beliefs (measured at week 11 and 12). Six weekly ratings of social anxiety as assessed using the SP-12 were also included in the model. The weekly ratings corresponded with the time-points at which ambivalence was assessed (i.e., week 6, 7, 8, 9, 11, and 12). Thus the model was a six wave (time-lag one: week 6, time-lag two: week 7, time-lag three: week 8, time-lag four: week 9, time-lag five: week 11, time-lag six: week 12) cross-lagged analysis that examined the relationship across the manifest variables after controlling for all variables previously specified in the model. Six lags were chosen as this corresponded to the time-points at which CBT task-related ambivalence was assessed and linked to particular components of the treatment protocol (attentional training, behavioral experiments and feedback, and challenging core beliefs). Cross-lagged regression coefficients examine how much variance in one variable at time 1 is able to predict change in another variable between times 1 and 2, over and above controls specified in the model. Consistent with Aderka, McLean, Huppert, Davidson, and Foa (2013) the model also included and controlled for correlations between ambivalence and social anxiety at each time point (i.e., synchronous correlations), and the relationship between the

same variable at different time points (i.e., stability effects; e.g., social anxiety at week 6 and social anxiety at week 7).

The cross-lagged panel analysis was conducted using MPlus (version 7). Because the χ^2 statistic is sensitive to sample size, a combination of goodness-of-fit indices was used to evaluate model fit (recommended values are indicated in parentheses): χ^2 ($p > .05$), relative χ^2 statistic (χ^2 / degree of freedom (df): < 3 good; Kline, 1998), comparative fit index (CFI; $> .90$ acceptable, $> .95$ excellent; Bentler 1990), the Tucker-Lewis index (TLI; $> .90$ acceptable, $.95$ excellent; Tucker & Lewis, 1973), the root mean square error of approximation (RMSEA; $< .08$ acceptable, $< .05$ excellent, Browne & Cudeck, 1993), and the standardized root mean square residual (SRMR; $< .08$, Hu & Bentler, 1999).

Results

Sample characteristics

Baseline demographic characteristics, ambivalence, and anxiety severity were analyzed using independent samples t-tests for continuous variables and chi-square for nominal/categorical variables (Table 1). Treatment conditions (SC vs. TEE) did not differ on baseline anxiety, ambivalence scores, or demographic characteristics, except that there were more female participants in the SC-CBT group. Further independent samples t-tests comparing males and females on predictor and outcome variables were non-significant for all variables.

<Insert Table 1>

Condition discrimination

TEE and SC were found to be equally credible: TEE: $M = 18.18$, $SD = 6.27$; SC: $M = 16.99$, $SD = 6.68$; $t(142) = 1.10$, $p = .273$. Analyses of client evaluations of TEE/SC showed that there were significant differences between groups on the technical (TEE: $M = 22.89$, SD

= 4.82; SC: $M = 16.37$, $SD = 6.96$), $t(142) = 6.40$, $p < .001$, and relational factor (TEE: $M = 29.09$, $SD = 3.62$; SC: $M = 30.41$, $SD = 2.87$), $t(142) = -2.43$, $p = .016$, whereby TEE participants rated higher on the technical factor and SC higher on the relational factor. Overall, TEE therapists demonstrated greater adherence to MI according to MITI standards, though SC therapists showed a higher percentage of MI-Adherent responses (as seen in Table 2). Clients in TEE sessions uttered more language relevant to change, including change talk (TEE: $M = 30.82$, $SD = 19.73$; SC: $M = 1.20$, $SD = 2.63$, $t(35) = 6.66$, $p < .001$), and counter-change talk (TEE: $M = 12.18$, $SD = 11.74$; SC: $M = .45$, $SD = 1.05$, $t(35) = 4.46$, $p < .001$), and less neutral language (TEE: $M = 79.59$, $SD = 38.45$; SC: $M = 156.70$, $SD = 60.10$, $t(35) = -4.55$, $p < .001$).

<Insert Table 2>

Ambivalence change

Because clients were nested within treatment groups, we first explored the amount of variability in ambivalence scores that occurred at the group level using a 3-level unconditional model. Overall, there was very little effect of group on ambivalence scores; for CQ, TAQ Total, TAQ Adverse Reactions to Treatment, and TAQ Personal Consequences of Treatment, a statistically inadmissible solution was obtained, thus variability in these ambivalence scores due to nesting of clients within groups was negligible (implying an ICC very close to 0), thus not necessitating a 3-level model. However, for TAQ Inconvenience of Treatment, the ICC was .132, suggesting that 13.2% of the total variance in scores on this subscale were accounted for by differences in groups. Therefore a 3-level model was retained when examining this subscale.

CQ Questionnaire. Mixed model analysis comparing TEE-CBT with SC-CBT on changes in CQ questionnaire scores showed a significant main effect of time, $F(1, 142.62) = 5.78$, $p = .017$, where CQ scores were shown to increase from pre to post TEE/SC. However

the effect of condition (TEE vs. SC) was non-significant, $F(1, 145.16) = 1.66, p = .200$, as was the Condition x Time interaction, $F(1, 142.62) = 1.45, p = .231$.

TAQ. Mixed model analyses comparing TEE-CBT with SC-CBT on changes in TAQ total scores were non-significant (time: $F(1, 143.16) = .98, p = .323$; condition: $F(1, 145.42) = 1.05, p = .307$; Time x Condition: $F(1, 143.16) = .03, p = .867$). A secondary analysis was conducted to evaluate changes in TAQ subscales. Neither time nor condition predicted change in TAQ subscale scores; Adverse Reactions to Treatment (time: $F(1, 142.91) = 2.81, p = .096$, condition: $F(1, 145.08) = .09, p = .767$, Time x Condition: $F(1, 142.91) = 1.58, p = .211$); Personal Consequences of Treatment (time: $F(1, 143.25) = .16, p = .690$, condition: $F(1, 145.44) = 2.81, p = .096$, Time x Condition: $F(1, 143.25) = .83, p = .364$) and; Inconvenience of Treatment (time: $F(1, 143.35) = .01, p = .942$; condition: $F(1, 145.57) = .07, p = .798$) and; Time x Condition ($F(1, 143.35) = .06, p = .814$). However, the parameter estimate for the effect of time on Adverse Reactions to Treatment was significant, $t(142.73) = -1.99, p = .048$, indicating that ambivalence scores increased for the TEE group specifically.

Taken together, these results suggest that ambivalence changes with time (albeit not on all measurements of the construct) but the main effect of treatment condition does not impact changes in ambivalence.

Ambivalence as a predictor of treatment outcome

Although group effects were expected because clients were nested within treatment groups, inclusion of a third level to account for variation in SIAS scores due to group did not explain a significant proportion of the variance. The ICC for the effect of group was .017, suggesting that less than 2% of the total variance in SIAS scores was accounted for by differences between groups. Therefore a 2-level model was retained. Second, to determine whether inclusion of a random slope was necessary, an unconditional growth model that included a random slope at the subject level was compared to the intercept only model. The ICC for the random slope was .15 and inclusion of a random slope resulted in better model fit

(-2RLL = 3009.73 vs. 3157.56, $\chi^2(2) = 147.82, p < .001$. Therefore, a random slope was added to multilevel models of ambivalence predicting SIAS scores⁸.

Pre-treatment ambivalence. First, the effect of baseline CQ and TAQ scores were entered as predictors in a two-level multilevel model that included a random intercept and slope. Condition (SC = 0, TEE = 1), baseline DASS scores, and interaction terms between baseline predictors (CQ and TAQ) and time, and between predictors and treatment condition were also included in the model.

Results revealed that SIAS scores significantly decreased over time, $t(120.36) = -12.54, p < .001$, with higher DASS scores significantly predicting higher SIAS scores, $t(137.12) = 6.54, p < .001$. CQ and TAQ scores did not predict either SIAS scores or the slope of anxiety change (CQ intercept: $p = .458$; CQ by time: $p = .198$; TAQ intercept: $p = .436$, TAQ by time: $p = .731$).

Second, to examine the effect of TAQ subscale scores, baseline CQ and TAQ subscale scores were entered as predictors in a two-level model that included a random intercept and slope. The effect of condition (TEE vs. SC), baseline DASS scores, and interaction terms between ambivalence (CQ and TQ subscales) with time and condition were also included in the model.

Results showed that higher scores on DASS and TAQ adverse reactions to treatment were related to worse treatment outcome ($\beta = .98, p < .001$, and $\beta = .46, p = .004$, respectively). The effect of TAQ Personal Consequences of Treatment approached significance, with higher scores predicting better treatment outcome ($\beta = -.23, p = .066$). TAQ Inconvenience of Treatment and CQ scores did not significantly predict SIAS change or trajectory. However there was a significant interaction between TAQ Personal Consequences of Treatment and condition to predict anxiety severity ($\beta = .38, p = .017$) and between CQ

⁸ For all analyses predicting SIAS outcome, the intercept only model was compared to the model that included a random slope and for all analyses the slope model significantly improved model fit, therefore results have been presented for two level mixed models that included a random intercept and random slope.

scores and condition ($\beta = 3.33, p = .048$). The interaction between TAQ Adverse Reactions to Treatment and condition approached significance ($\beta = -.36, p = .067$). In examining a pictorial depiction of the interaction between TAQ Personal Consequences and condition (Figure 1), anxiety outcome severity appeared to remain stable across levels of ambivalence for the TEE group, whereas for the SC group, increases in ambivalence corresponded with increases in SIAS scores. Examination of the plot between CQ scores and condition (Figure 2) pointed to a similar interaction, though there appeared to be a greater disparity between low and high levels of ambivalence. For lower levels of ambivalence the SC group showed better outcome, and TEE group worse outcome (though outcome still remained relatively stable across levels of ambivalence for the TEE group), whereas in moving to higher levels of ambivalence, the TEE group showed better outcome, and SC group worse outcome. Parameter estimates, standard errors and corresponding significance values are presented in Table 3.

<Insert Table 3>

<Insert Figure 1>

<Insert Figure 2>

Change in ambivalence. Given that only CQ scores changed over time, only these scores were used to predict SIAS outcome severity, after controlling for DASS scores. In order to account for change in CQ scores, a difference score was computed, where the baseline CQ score was subtracted from the Post-Phase one CQ score. This difference score was then entered as a predictor variable. Besides the effect of time, the only significant predictor of SIAS scores were DASS scores, $t(137.17) = 6.89, p < .001$. The effect of CQ difference scores on the intercept and slope of SIAS were non-significant ($p = .479, p = .714$, respectively), as was the interaction term between CQ difference scores and condition ($p = .285$).

Taken together, these results suggest that baseline levels of ambivalence predict anxiety severity outcome (though not all measures of ambivalence), and that treatment condition moderates the effect of particular types of ambivalence on outcome.⁹

In-session ambivalence

Means and standard deviations for task-related ambivalence by treatment condition are presented in Table 4. There were no differences between groups on CBT task-related ambivalence. Correlations between task-related ambivalence and social anxiety ratings in weeks 6-12 are presented in Table 5. In general task-related ambivalence and the average in-session ambivalence score were positively correlated with SP-12 scores in Week 6 – 12. The only task-related ambivalence score that did not significantly correlate with SP-12 scores at any week was ambivalence for behavioral experiments in Week 6.

<Insert Table 4>

<Insert Table 5>

To examine whether in-treatment data were missing at random, Little's Missing-Completely-At-Random (MCAR) Test (Little & Rubin, 1989) was used. Missing data points were missing completely at random ($\chi^2 = 2403.413$, $df = 2402$, $p = .488$, *n.s.*).

The cross-lagged structural equation model was estimated with all synchronous effects, stability effects, and cross-lagged effects. Some model fit indices suggested that the model provided a reasonable fit of the data (Relative $\chi^2 = 2.13$, CFI = 0.94, TLI = 0.89, SRMR = 0.07), though the χ^2 test of model fit was significant ($\chi^2 = 85.30$, $df = 40$, $p < .001$)

⁹ In order to ensure that analyses were not affected by missing data due to participant dropout, the pattern-mixture approach detailed by Atkins (2005) was followed. A dummy variable for participant drop-out was added to each multilevel model as a predictor, along with the interaction term between drop-out and predictors. The drop-out variable was not significant in either therapist or client predictor models suggesting that results (i.e., the fixed effects estimates from the multi-level models) did not depend on missing data due to drop-out. *N.B.* Clients who attended less than eight CBT sessions (of 12) were counted as drop-outs.

and the RMSEA was unacceptable (.13).¹⁰ Cross-lagged effects revealed significant pathways between anxiety at week 9 and ambivalence at week 11 ($\beta = 0.04$, $SE = 0.02$, $p = .031$), anxiety at week 11 and ambivalence at week 12 ($\beta = 0.04$, $SE = 0.01$, $p = .001$), and ambivalence at week 9 and anxiety at week 11 ($\beta = 0.93$, $SE = 0.37$, $p = .013$). Two additional cross-lagged paths approached significance: anxiety at week 7 and ambivalence at week 8 ($\beta = 0.03$, $SE = 0.02$, $p = .051$), and ambivalence at week 6 and anxiety at week 7 ($\beta = 0.70$, $SE = 0.39$, $p = .075$). Stability effects indicated that the variable estimates at each time point could be predicted in part by previous time point ratings. For ambivalence: between week 6 and 7 ($\beta = 0.47$, $SE = 0.13$, $p < .001$), between week 7 and 8 ($\beta = 0.39$, $SE = 0.10$, $p < .001$), between week 8 and 9 ($\beta = 0.28$, $SE = 0.15$, $p = .057$), between week 9 and 11 ($\beta = 0.43$, $SE = 0.10$, $p < .001$), and between week 11 and 12 ($\beta = 0.70$, $SE = 0.09$, $p < .001$). For anxiety: between week 6 and 7 ($\beta = 0.86$, $SE = 0.09$, $p < .001$), between week 7 and 8 ($\beta = 0.90$, $SE = 0.05$, $p < .001$), between week 8 and 9 ($\beta = 0.90$, $SE = 0.04$, $p < .001$), between week 9 and 11 ($\beta = 0.90$, $SE = 0.05$, $p < .001$), and between week 11 and 12 ($\beta = 0.84$, $SE = 0.04$, $p < .001$). Surprisingly, synchronous model effects between anxiety and ambivalence at each time point were non-significant, though ambivalence and anxiety at week 6 approached significance ($\beta = 1.71$, $SE = 0.93$, $p = .065$). Figure 3 provides a pictorial depiction of all significant model paths. In summary, the pattern of associations shows that particularly in later weeks there is a reciprocal relationship between ambivalence scores and anxiety, however these relationships were not demonstrated during earlier CBT sessions.

<Insert Figure 3>

¹⁰ A second model that controlled for condition allocation was also tested, showing similar fit (Relative $\chi^2 = 1.86$, CFI = 0.94, TLI = 0.91, SRMR = 0.08, $\chi^2 = 96.36$, $df = 52$, $p < .001$, RMSEA = .11). The Akaike Information Criterion (AIC) was used to compare models, with smaller values indicating better fit (Burnham & Anderson, 1998). This second model had a greater AIC (3729.15 compared to 3629.12), thus results are presented for the model that did not control for allocation.

Discussion

The overall aim of the current study was to investigate the construct of ambivalence in the context of MI for social anxiety, with a particular interest in the following research questions: 1) Do participants who receive MI show decreases in ambivalence compared to a control condition; 2) what is the nature of the relationship between CBT task-related ambivalence and social anxiety during CBT; and 3) is client ambivalence related to treatment outcome following group CBT. The results show some support for study hypotheses however findings differed in relation to the different measurement indices of ambivalence.

The hypothesis that participants allocated to the MI condition would demonstrate greater changes in ambivalence than participants allocated to the supportive counseling condition was not supported. Results revealed that the condition to which participants were allocated was not a significant predictor of change in ambivalence from pre to post TEE/SC. However, there were changes in ambivalence over time, with scores on the CQ questionnaire increasing from pre to post phase one (TEE or SC) treatment. Interestingly, results showed a significant parameter estimate for time in predicting change in Adverse Reactions to Treatment, suggesting that ambivalence increased for the TEE group specifically. Given that one of the primary aims of MI is to resolve client ambivalence it was surprising that participants in the TEE condition did not show any decrease in ambivalence (scores on the TAQ did not change with time), and particularly that scores on the CQ questionnaire and TAQ adverse reactions showed a small increase over time. As admission to the treatment program was voluntary, it is possible that participants began TEE with a clear idea that they wanted to change and in discussing potential obstacles and barriers to change, they became more aware of factors that may be difficult in the change process. While it is important for clients to be aware of obstacles to change, perhaps only three sessions of TEE was not long enough to completely resolve ambivalence. Or alternatively, it is possible that clients expected to start actively tackling their anxiety, however the mismatch between this type of

expectation and the relatively inactive TEE sessions may have caused some ambivalence, which may also explain increases in the SC condition. Differences in results between the ambivalence measures may be due to the type of ambivalence each scale was tapping. Perhaps scores on the CQ questionnaire increased because clients gained more insight into personal reasons for staying the same either through TEE or self-reflection in SC, as opposed to more specific treatment related fears that are measured by the TAQ. As in Barrera et al. (2015), there was no change in TAQ total scores following phase one of treatment (TEE/SC) however there were increases in the Adverse Reactions to Treatment subscale for the TEE group in particular. This subscale assesses fears around potential increases in anxiety following treatment, emergence of new symptoms, and relapse (Rowa et al., 2014). Increases in this scale make sense particularly in the case of social anxiety, where first encountering a therapist during the preparatory sessions will likely result in anxious symptoms which may link to a greater awareness that treatment will be anxiety provoking and that it may be hard to progress through the CBT group program. Moreover, TEE sessions actively prepared clients for the treatment program, which might further impact on awareness of potential adverse reactions.

There were no differences between condition on task-related ambivalence during CBT, which is not surprising given that groups did not differ in levels of ambivalence after phase one and prior to embarking on CBT. Overall, there were positive associations between task-related ambivalence and ratings of social anxiety symptoms during week 6 to 12. Cross-lagged panel analysis particularly showed that there was a relationship between anxiety ratings at week 9 and ambivalence about challenging core beliefs at week 11, and anxiety ratings at week 11 and ambivalence about challenging core beliefs at week 12. However, the coefficients for these relationships were very small suggesting that the link between anxiety from one week to ambivalence about core beliefs the following week was not strong. There was a strong relationship between ambivalence about receiving feedback for a speech task at week 9 and anxiety scores at week 11. This particular task involved receiving feedback from

the group therapist and other group members following a speech task and typically this type of behavioral experiment with feedback is very challenging and anxiety provoking for clients with social anxiety. This finding may suggest that it is important to track client ambivalence throughout treatment and that, perhaps when clients encounter tasks that are more strongly related to anxiety, an MI-approach could be useful to encourage clients to be aware of the benefits of the task and feel ready to undertake the task before having to complete it. Furthermore, given that in this case ambivalence about the feedback task rated at week 9 was related to client anxiety rated in week 11, perhaps after the client completes the task there could be a discussion around any ambivalence that has surfaced to potentially limit increases in anxiety for following weeks. However, the findings of the cross-lagged panel analysis should be interpreted with caution given the non-perfect model fit. Still though, bivariate correlations did show a link between ambivalence and anxiety ratings each week.

Results for the third research question showed that baseline TAQ Adverse Reactions to Treatment was a significant predictor of anxiety outcome severity, after controlling for levels of general distress as measured by the DASS. The conditional effect (but not the main effect) of baseline TAQ Personal Consequences of Treatment approached significance, with higher scores relating to better treatment outcome. However, total scores on the TAQ and Inconvenience of Treatment did not significantly predict anxiety severity change, nor did baseline CQ or CQ difference scores. These findings suggest that ambivalence specifically related to fears of increasing anxiety symptoms or relapse, for example, predicts higher ratings of anxiety symptoms. This is an important finding as it may suggest a need to focus on specific treatment related fears around clients having heightened symptoms after engaging in treatment and the potential for adverse reactions and relapse to occur. It is possible that an increase in feelings of ambivalence regarding adverse reactions might decrease the likelihood of client continued engagement in CBT strategies following treatment and that this lack of engagement might be linked to greater anxiety, particularly because CBT warrants continued

engagement with CBT techniques in order for anxiety to dissipate. So perhaps more time could be spent on resolving ambivalence around the idea that treatment will result in more anxiety or relapse in order to encourage clients to continue to engage in CBT techniques. This could be done during the CBT protocol, or at the end of CBT. While the final session of the current CBT protocol includes a discussion of relapse it does not address the costs and benefits of continuing to engage in the CBT strategies, which may be important. Interestingly, there was a significant interaction between personal consequences and treatment condition, and between CQ scores and condition. Similarly, the interaction between treatment condition and baseline Adverse Reactions to Treatment approached significance. On examination of the plots of the interactions, it appeared as though receiving TEE moderated the effect of high levels of ambivalence on treatment outcome. That is, those people high in ambivalence in the TEE condition had better outcome than those higher in ambivalence in the SC group. On the other hand, people with lower levels of ambivalence appeared to have better outcome in the SC group than the TEE group. However, anxiety severity seemed to remain relatively stable across levels of ambivalence for the TEE group, which could suggest that TEE may alleviate the negative impact of ambivalence on post treatment outcome severity. This finding coincides with research by Button et al. (2015) where clients with higher ambivalence (counter-change talk), had better long-term outcomes if they received MI-CBT versus CBT alone. In the current sample, perhaps clients who received MI were more equipped with skills to deal with higher levels ambivalence and became more aware of the reasons and values associated with their anxiety change. Gaining insight into ambivalence during CBT may have helped clients to deal with feelings of ambivalence throughout the CBT program and following treatment. For example, in experiencing ambivalence during CBT, clients might behave differently if they have become aware of the personal consequences of treatment or more general reasons to change or not change, and therefore may be more engaged or less resistant to CBT techniques, which may impact distal outcomes. Also, in the longer term,

when these clients experience difficulties related to their social anxiety, perhaps they are able to draw on the insight gained during MI and remind themselves of reasons to continue to implement CBT strategies. On the other hand, those clients lower in ambivalence appeared to do better if they received SC which may indicate that MI is particularly useful for clients who need time to discuss change and ambivalence, compared to those who are more “ready” to begin active change. Given that condition moderated the effect of TAQ personal consequences, CQ scores, and approached significance for adverse reactions, it was surprising that this effect was not found for inconvenience of treatment. This may be due to the content of the TEE sessions and specific reasons relating to change for clients in the current sample. For example, perhaps TEE clients discussed change topics that were more associated with general ambivalence or reasons surrounding personal consequences and adverse reactions, as opposed to topics related to inconvenience of treatment as a barrier to change.

An implication of the current research is that preparatory MI prior to CBT for social anxiety does not decrease ambivalence. Perhaps MI techniques may be more effective if implemented throughout the CBT program as opposed to within a preparatory program. In theory, MI is used until the client no longer feels ambivalent and is on board with making changes, however this is difficult to adhere to in the context of a treatment trial whereby clients receive the same amount of MI whether or not they are “ready” to engage in CBT. Also, positive relationships between ambivalence and anxiety during CBT point to the idea that therapists might need to continually work to reduce and resolve ambivalence throughout the treatment program, particularly when a more difficult task is approached for example. This idea coincides with research on resistance during CBT, whereby an MI style approach in response to client resistance during CBT was linked to greater post-treatment worry reduction (Aviram et al., 2016). In line with this, an MI-style might ensure clients are “ready” and on board with tasks as opposed to assuming that everyone undertakes the task at the same time-point. Quick assessments of task-related ambivalence may be particularly useful in the

context of social anxiety, where clients often have fears around voicing their opinions and as such might acquiesce to performing a task without feeling ready to do it which may influence their anxiety in following weeks or perhaps likelihood that they return to the following session or at all.

While there are some important implications of the study findings, the results need to be interpreted in light of study limitations. One limitation relates to the methodology for assessing task-related ambivalence. Particularly, the measure of task-related ambivalence was purpose built for the current study. While the items did correlate with established measures of ambivalence and scores were computed based on the DB methodology, perhaps an established measure of task-related ambivalence would have achieved different results. However, to our knowledge, there is no measure for task-related ambivalence relevant to CBT for social anxiety, which may offer an avenue for future research. Furthermore, the cross-lagged analysis achieved only small coefficients and overall model fit was not acceptable according to all model fit indices. Also, synchronous effects were not significant which was surprising given significant bivariate correlations. A further limitation is that while the SIAS presents a good measure of SAD symptoms, this was the only measure assessed from baseline to follow-up and may not capture all the intricacies of an SAD diagnosis, including clinician ratings. Finally, the correlational nature of the results does not rule out other variables that may affect the relationships between ambivalence and treatment outcome, and experimental research that manipulates these variables would help to establish causation. While a strength of the current study is the use of a control condition to more clearly elucidate the effect of MI, client evaluations showed SC to be higher on the CEMI relational component, and SC therapists also demonstrated a greater percentage of MI adherent behaviors. These findings may be attributed to the focus of the TEE sessions. SC therapists were proscribed from discussing change related topics thus there was very little opportunity to give advice or offer direction about change, let alone in a MI-inconsistent fashion, which might explain higher

relational ratings and percentage of MI adherent behaviors. Nevertheless the TEE therapists demonstrated greater proficiency in terms other MITI standards and importantly on MI Spirit. A related point is that MI proficiency was not achieved for all MITI standards, which may call the fidelity of the MI into question. However, the training provided in the larger randomized controlled trial was designed to mimic MI training that might be used in general clinical practice, and it is promising that the MI delivered here still appeared to moderate the effect of ambivalence, as shown in a study that employed more thorough MI training techniques (Button et al., 2015).

Corresponding with an experimental design, further research may look at the relationships between ambivalence and more proximal treatment outcomes. For example, ambivalence about treatment tasks may link to a client's homework compliance, session attendance, and resistance during CBT and these variables could further predict treatment outcome. Also, while the variation of therapist was accounted for by using the MLM procedure, changes in ambivalence from pre to post MI might occur in partnership with client change talk and specific therapist behaviors that were not examined in the current study. In addition, further validation of the task-related ambivalence measure would be worthwhile, as a quick measure of task-related ambivalence during treatment could help to determine whether a more MI-based approach is necessary at particular treatment points.

The current study is the first to examine the construct of ambivalence in the context of MI, as compared to supportive counseling, for social anxiety in a relatively large treatment-seeking sample. Although support for hypotheses was mixed, the findings suggest that ambivalence, particularly about adverse reactions to treatment, may be an important factor to focus on during MI for socially anxious clients, and that MI might play a role in alleviating the effects of high levels of ambivalence on treatment outcome. Furthermore, there may be a need to more thoroughly integrate MI principles throughout CBT in order to capture and resolve ambivalence that may arise during treatment and potentially further enhance treatment

outcome. Though the current study expands upon the examination of MI mechanisms in anxious populations, overall, there is a need for further research into MI mechanisms of change in the context of SAD.

References

- Aderka, I. M., McLean, C. P., Huppert, J. D., Davidson, J. R. T., & Foa, E. B. (2013). Fear, avoidance and psychological symptoms during cognitive-behavioral therapy for social anxiety disorder. *Behavior Research and Therapy*, *51*, 352–358. doi:10.1016/j. brat.2013.03.007.
- Arkowitz, H., Miller, W. R., & Rollnick, S. (Eds.). (2015). *Motivational interviewing in the treatment of psychological problems*. (2nd ed.). New York: Guilford Press.
- Arkowitz, H., Westra, H. A., Miller, W. R., & Rollnick, S. (Eds.). (2008). *Motivational interviewing in treating psychological problems*. New York: Guilford Press.
- Atkins, D. C. (2005). Using multilevel models to analyze couple and family treatment data: Basic and advanced issues. *Journal of Family Psychology*, *19*, 98-110. doi 10.1037/0893-3200.19.1.98
- Aviram, A., & Westra, H. A. (2011). The impact of motivational interviewing on resistance in cognitive behavioral therapy for generalized anxiety disorder. *Psychotherapy Research*, *21*, 698–708. doi:10.1080/10503307.2011.610832
- Aviram, A., Westra, H. A., Constantino, M. J., & Antony, M. M. (2016). Responsive management of early resistance in cognitive-behavioral therapy for generalized anxiety disorder. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000100
- Barrera, T. L., Smith, A. H., & Norton, P. J. (2015). Motivational interviewing as an adjunct to cognitive behavioral therapy for anxiety. *Journal of Clinical Psychology*, *0*, 1-10. doi: 10.1002/jclp.22239
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*, 238–246. doi:10.1037/0033-2909.107.2.238

- Borkovec, T., & Nau, S. (1972). Credibility of analogue therapy rationales. *Journal of Behavior Therapy and Experimental Psychiatry*, 3, 257-260. doi: 10.1016/0005-7916(72)90045-6
- Brody, A. E., Arkowitz, B. A., & Allen, J. J. B. (2008). *Development and validation of a self-report measure of ambivalence towards change*. Poster presented at the annual meeting of the Association for Psychological Science, Chicago.
- Browne, M., & Cudeck, R. (1993). Alternate ways of assessing model fit. In K. Bollen & J. Long (Eds.), *Testing structural equation models* (pp. 136–162). Thousand Oaks, CA: Sage.
- Buckner, J. D., & Schmidt, N. B. (2009). A randomized pilot study of motivation enhancement therapy to increase utilization of cognitive-behavioral therapy for social anxiety. *Behavior Research and Therapy*, 47, 710–715. doi:10.1016/j. brat.2009.04.009.
- Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. *Journal of Consulting and Clinical Psychology*, 71, 843–861. doi:10.1037/0022-006X.71.5.843.
- Burnham, K. P., & Anderson, D. R. (1998). *Model selection and inference: A practical information–theoretic approach*. New York, NY: Springer-Verlag.
- Button, M. L., Westra, H. A., Constantino, M. J., & Antony, M. M. (2015). *Client motivation as a moderator of treatment outcomes in MI-CBT for generalized anxiety*. In H. A. Westra and M. J. Constantino (Moderators), *An allegiance controlled RCT of MI-CBT for generalized anxiety*. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.
- Ciarrochi, J. V., & Bailey, A. (2008). *A CBT Practitioner's Guide to ACT: How to Bridge the Gap Between Cognitive Behavioral Therapy and Acceptance and Commitment Therapy*. Oakland, CA: New Harbinger Publications.
- Constantino, M. J., Westra, H. A., & Antony M. M (2015). *Mediators of treatment effects in a*

randomized controlled trial testing the efficacy of augmenting CBT with motivational interviewing for severe generalized anxiety disorder. In H. A. Westra and M. J. Constantino (Moderators), *An allegiance controlled RCT of MI-CBT for generalized anxiety.* Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.

Di Nardo, P., Brown, T., & Barlow, D. (1994). *Anxiety Disorders Interview Schedule for DSM-IV - Lifetime version.* Albany, NY: Graywind Publications.

Forsyth, J. P., & Eifert, G. H. (2007). *The mindfulness and acceptance workbook for anxiety.* Oakland, CA: New Harbinger Publications.

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney, Australia: The Psychology Foundation of Australia.

Gibbons, R. D., Hedeker, D., Elkin, I., Waternaux, C., Greenhouse, J. B., Shea, M. T., et al. (1993). Some conceptual and statistical issues in analysis of longitudinal psychiatric data: Application to the NIMH Treatment of Depression Collaborative Research Program data set. *Archives of General Psychiatry*, 50, 739–750. doi:10.1001/archpsyc.1993.01820210073009

Hedeker, D., Gibbons, R. D., & Flay, B. R. (1994). Random-effects regression models for clustered data with an example from smoking prevention research. *Journal of Consulting and Clinical Psychology*, 62, 757–765. doi: 10.1037/0022-006X.62.4.757

Herzog, T. A., Lazev, A. B., Irvin, J. E., Juliano, L. M., Greenbaum, P. E., & Brandon, T. H. (2002). Testing for group membership effects during and after treatment: The example of group therapy for smoking cessation. *Behavior Therapy*, 33, 29–43. doi:10.1016/S0005-7894(02)80004-1

Hettema, J., Steele, J., & Miller, W. R. (2005). Motivational interviewing. *Annual Review of Clinical Psychology*, 1, 91–111. doi:10.1146/annurev.clinpsy.1.102803.143833

- Houck, J., Moyers, T. B., Miller, W. R., Glynn, L., & Hallgren, K. (2013). Motivational Interviewing Skill Code 2.5. Retrieved from <http://casaa.unm.edu/download/misc25.pdf>
- Hu, L. T., & Bentler, P. M. (1995). Evaluating model fit. In R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications* (pp. 76–99). Thousand Oaks, CA: Sage.
- Kline, R. B. (1998). *Principles and practice of structural equation modeling*. New York, NY: Guilford Press.
- Little, R. J. A., & Rubin, D. B. (1989). The analysis of social science data with missing values. *Sociological Methods & Research*, 18, 292–326. doi:10.1177/0049124189018002004.
- Madson, M. B., Bullock, E. E., Speed, A. C., & Hodges, S. A. (2009). Development of the client evaluation of motivational interviewing. Motivational Interviewing Network of Trainers Bulletin, 15, 6–8. Retrieved from http://motivationalinterview.org/mint/MINT15_1.pdf
- Madson, M. B., Mohn, R. S., Zuckoff, A., Schumacher, J. A., Kogan, J., Hutchison, S.,...Stein, B. (2013). Measuring client perceptions of motivational interviewing: factor analysis of the Client Evaluation of Motivational Interviewing scale. *Journal of Substance Abuse Treatment*, 44, 330 – 335. doi: 10.1016/j.jsat.2012.08.015
- Mattick, R., & Clarke, J. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behavior Research and Therapy*, 36, 455-470. doi: 10.1016/S0005-7967(97)10031-6
- Miller, W. R., & Rollnick, S. (1991). Motivational interviewing: *Preparing people to change addictive behavior*. New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2004). Talking oneself into change: Motivational interviewing,

- stages of change, and therapeutic process. *Journal of Cognitive Psychotherapy: An International Quarterly*, 18, 299–308. doi:10.1891/jcop.18.4.299.64003
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York: Guilford Press.
- Miller, W. R., & Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist*, 64, 527–537. doi:10.1037/a0016830
- Moyers, T. B., Martin, T., Manuel, J. K., Miller, W. R., & Ernst, D. (2010). Manual for the revised global scales: Motivational interviewing treatment integrity 3.1.1 (MITI 3.1.1). Retrieved from <http://casaa.unm.edu/download/miti3.pdf>
- Peters, L. (2000). Discriminant validity of the Social Phobia and Anxiety Inventory (SPAI), the Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (SIAS). *Behavior Research and Therapy*, 38, 943–950. doi:10.1016/S0005-7967(99)00131-X
- Peters, L., Sunderland, M., Andrews, G., Rapee, R. M., & Mattick, R. P. (2012). Development of a short form social interaction anxiety (SIAS) and social phobia scale (SPS) using nonparametric item response theory: The SIAS-6 and the SPS-6. *Psychological Assessment*, 24, 66-76. doi:10.1037/a0024544
- Rapee, R., Gaston, J., & Abbott, M. (2009). Testing the efficacy of theoretically-derived improvements in the treatment of social phobia. *Journal of Consulting and Clinical Psychology*, 77, 317-327. doi: 10.1037/a0014800
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.
- Raudenbush, S. W., et al. (2011). Optimal Design Software for Multi-level and Longitudinal Research (Version 3.01). Available from www.wtgrantfoundation.org.

- Romano, M., & Peters, L. (2015). Evaluating the mechanisms of change in motivational interviewing in the treatment of mental health problems: A review and meta-analysis. *Clinical Psychology Review*, 38, 1-12. doi: 10.1016/j.cpr.2015.02.008
- Rowa, K., Gifford, S., McCabe, R., Milosevic, I., Antony, M. M., & Purdon, C. (2014). Treatment fears in anxiety disorders: Development and validation of the treatment ambivalence questionnaire. *Journal of Clinical Psychology*, 00, 1-15. doi: 10.1002/jclp.22096
- Selig, J. P., & Little, T. D. (2012). Autoregressive and cross-lagged panel analysis for longitudinal data. In B. Laursen, T. D. Little, & N. A. Card. (Ed.), *Handbook of Developmental Research Methods* (pp. 265–278). New York: Guilford Press.
- Slagle, D.M., & Gray, M. J. (2007). The utility of motivational interviewing as an adjunct to exposure therapy in the treatment of anxiety disorders. *Professional Psychology: Research and Practice*, 38, 329–337. doi:10.1037/0735-7028.38.4.329
- Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor analysis. *Psychometrika*, 38, 1–10. doi: 10.1007/BF02291170
- Westra, H. A., Arkowitz, H., & Dozois, D. J. (2009). Adding a motivational interviewing pretreatment to cognitive behavioral therapy for generalized anxiety disorder: A preliminary randomized controlled trial. *Journal of Anxiety Disorders*, 23, 1106–1117. doi:10.1016/j.janxdis.2009.07.014
- Westra, H. A., Aviram, A., & Doell, F. K. (2011). Extending motivational interviewing to the treatment of major mental health problems: Current directions and evidence. *The Canadian Journal of Psychiatry*, 56, 643–650. doi: 10.1177/070674371105601102
- Westra, H. A., Constantino, M. J., & Antony M. M (2016). Integrating motivational interviewing with cognitive-behavioral therapy for severe generalized anxiety disorder: An allegiance-controlled randomized clinical trial. *Journal of Consulting and Clinical Psychology*. Advance

Westra, H. A., & Dozois, D. J. A. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and Research*, 30, 481–498. doi:10.1007/s10608-006-9016-y

Westra, H., & Dozois, D. (2008). Integrating motivational interviewing into the treatment of anxiety. In H. Arkowitz, et al. (Eds.). *Motivational interviewing in the treatment of psychological problems*. New York: Guilford.

Table 1.

Comparison of baseline demographic characteristics of participants in TEE-CBT (n=66) vs. SC-CBT (n = 81^a)

	Total	TEE-CBT	SC-CBT	χ^2	<i>t</i>	<i>P</i>
<u>Continuous</u>						
<u>M (SD)</u>						
Age	32.05 (9.88)	30.82 (8.51)	33.05(10.83)		-1.37	.174
SIAS	55.51 (11.40)	55.26 (10.69)	55.71(12.01)		-.24	.811
TAQ Total	69.77 (23.98)	71.47 (25.71)	68.36(22.53)		.78	.438
TAQ Subscales						
Consequences	25.29 (12.01)	27.24 (13.06)	23.69(10.88)		1.79	.075
Reactions	29.14 (10.77)	28.83 (10.68)	29.39(10.91)		-.31	.758
Inconvenience	15.34 (6.24)	15.39 (5.86)	15.29 (6.58)		.10	.919
CQ	0.34 (1.16)	0.41 (1.10)	0.28 (1.20)		.67	.505
DASS	9.52 (5.14)	9.64 (4.75)	9.43 (5.47)		.25	.806
<u>Categorical</u>						
<u>f (%)</u>						
Female	72 (49%)	24 (36%)	48 (59%)	7.63		.006
Country of origin – Australia	96 (65%)	48 (73%)	48 (59%)	5.41		.248
Identification with other ethnic group	31 (21%)	13 (20%) ^b	18 (22%) ^c	.14		.709
Bachelor degree or higher	82 (56%)	33 (50%)	49 (61%)	3.56		.829
Employed	75 (51%)	31 (46%)	44 (55%)	2.78		.904
Never married	102 (69%)	47 (71%)	55 (68%)	1.44		.838

Additional diagnosis ^d	83 (57%)	35 (53%)	48 (59%)	.57	.449
GAD	39	19	20		
MDD	34	18	16		
Specific Phobia	25	9	16		
Dysthymia	9	5	4		
OCD	8	4	4		
Other	18	2	16		
APD	74 (50%)	32 (49%)	42 (51%)	.17	.685
Current Medication	43 (29%)	22 (33%)	21 (26%)	.96	.326

Note. TEE-CBT = Treatment expectations and engagement and Cognitive behavioral therapy; SC-CBT = Supportive counseling; SIAS = Social Interaction and Anxiety Scale; TAQ = Treatment Ambivalence Questionnaire; CQ = Change Questionnaire; DASS = Depression Anxiety and Stress Scales; GAD = Generalized anxiety disorder; MDD = Major depressive disorder; OCD = Obsessive compulsive disorder; APD = Avoidant personality disorder

^aTotal scores and scores for the SC group on anxiety severity and ambivalence measures are based on $n = 146$ and $n = 80$, as one client did not complete baseline measures.

^bIn the TEE condition six participants identified as Chinese and seven participants identified with one each of the following ethnic groups; Indian, Italian, Korean, Middle Eastern, Muslim, Nepalese, and Turkish.

^cIn the SC condition seven participants identified as Chinese, two as Indian, and nine participants identified with one each of the following ethnic groups; Anglo-Asian, European, Hispanic, Israeli, Korean, Latin American, Spanish, Taiwanese, and Vietnamese.

^dThe number of additional Axis 1 diagnoses does not equate to the percentage of the sample as some participants had more than one additional diagnosis.

Table 2.

Motivational Interviewing (MI) fidelity results

	MITI fidelity standard	TEE <i>M (SD)</i>	SC <i>M (SD)</i>	<i>t</i>	<i>p</i>
% MI-Adherent	90%	86% (11.19)	99% (4.02)	-4.47	< .001
% open question	50%	45% (12.85)	23% (8.13)	6.28	< .001
% complex reflection	40%	56% (11.29)	37% (20.41)	3.39	.002
Reflection-to-question ratio	1.0	.78 (.45)	.64 (.40)	.99	.328
Empathy	Average of 3.5	4.65 (.61)	4.45 (.83)	.81	.421
Direction	Average of 3.5	4.53 (.72)	1 (.00)	22.06	< .001
MI Spirit	Average of 3.5	4.02 (.32)	3.63 (.10)	5.08	< .001

Note. MITI = Motivational Interviewing Treatment Integrity. MI Spirit represents an average of three therapist global ratings (Autonomy Support, Evocation, and Collaboration). Fidelity measures were calculated using existing MISC 2.5 data and then compared with MITI fidelity standards. The MITI standard represents that for beginning proficiency.

Table 3.

Multilevel model for ambivalence predicting anxiety outcome

Fixed Effect	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept of SIAS				
Time	-7.77	.61	-12.75	< .001
Condition	-.85	1.49	-.57	.571
DASS	.98	.15	6.55	< .001
CQ	-2.04	1.33	-1.53	.129
TAQ Reactions	.46	.16	2.96	.004
TAQ Consequences	-.23	.12	-1.85	.066
TAQ Inconvenience	.07	.28	.26	.793
Condition X CQ	3.33	1.67	1.99	.048
Condition X Reactions	-.36	.20	-1.85	.067
Condition X Consequences	.38	.16	2.42	.017
Condition X Inconvenience	-.26	.33	-.79	.432
Linear slope of SIAS				
CQ X Time	.50	.69	.73	.470
TAQ Reactions X Time	.04	.08	.50	.618
TAQ Consequences X Time	-.08	.06	-1.37	.172
TAQ Inconvenience X Time	.20	.12	1.63	.106

Note. β = standardized coefficient; *SE* = Standard Error; SIAS = Social Anxiety Severity Scale; DASS = Depression Anxiety and Stress Scales; CQ = Change Questionnaire; TAQ Reactions = Treatment Ambivalence Questionnaire Adverse Reactions to Treatment Subscale; TAQ Consequences = Personal consequences subscale; TAQ Inconvenience = Inconvenience of treatment subscale; Condition = SC-CBT (coded 0), TEE-CBT (coded 1).

Table 4.

Comparison of CBT task-related ambivalence between TEE-CBT and SC-CBT treatment conditions

	TEE-CBT <i>M (SD)</i>	SC-CBT <i>M (SD)</i>	<i>t</i>	<i>df</i>	<i>p</i>
Week 6					
BE ambivalence	1.66 (1.02)	1.45 (1.25)	1.05	127	.294
AS ambivalence	1.73 (1.33)	1.58 (1.27)	.66	126	.512
Week 7					
BE ambivalence	1.64 (1.11)	1.47 (1.05)	.87	112	.386
AS ambivalence	1.74 (1.13)	1.51 (1.34)	.99	112	.324
SB ambivalence	1.60 (1.40)	1.69 (1.36)	-.35	112	.731
Week 8					
SB ambivalence	1.90 (1.30)	1.30 (1.31)	2.48	113	.015
FB ambivalence	1.69 (1.18)	1.52 (1.30)	.77	111	.445
Week 9					
FB ambivalence	1.61 (1.18)	1.43 (1.33)	.72	111	.472
Week 11					
CB ambivalence	1.30 (1.48)	1.56 (1.39)	-.97	112	.333
Week 12					
CB ambivalence	1.52 (1.45)	1.39 (1.50)	.46	111	.648
Ambivalence total					
Ambivalence total	1.93 (0.91)	1.66 (0.91)	1.73	131	.086

Note. BE = behavioral experiments; AS = anxiety surfing; SB = safety behaviors; FB = feedback; CB = core beliefs.

Table 5.

Bivariate correlations between CBT task-related ambivalence and social anxiety

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. BE 6																	
2. AS 6	0.44**	-															
3. SP 6	0.13	.20*	-														
4. BE 7	0.63**	.34**	.11	-													
5. AS 7	0.41**	0.35**	0.26**	0.44**	-												
6. SB 7	0.40**	.22*	0.23*	0.57**	0.38**	-											
7. SP 7	0.13	.28**	0.83**	0.21*	0.29**	0.30**	-										
8. SB 8	0.44**	.11	0.06	0.42**	0.45**	0.46**	0.13	-									
9. FB 8	0.27**	.21*	0.27**	0.33**	0.41**	0.51**	0.30**	0.38**	-								
10. SP 8	0.11	.23*	0.82**	0.18	0.23*	0.27**	0.92**	0.13	0.26**	-							
11. FB 9	0.39**	.23*	0.19*	0.31**	0.21*	0.37**	0.23*	0.45**	0.33**	0.29**	-						
12. SP 9	0.11	.24*	0.82**	0.22*	0.27**	0.32**	0.90**	0.23*	0.32**	0.91**	0.29**	-					
13. CB 11	0.20*	.35**	0.18	0.34**	0.21*	0.39**	0.23*	0.49**	0.32**	0.22*	0.43**	0.36**	-				
14. SP 11	0.09	.20*	0.78**	0.23*	0.28**	0.24*	0.86**	0.20*	0.24*	0.89**	0.32**	0.90**	0.29**	-			
15. CB 12	.39**	0.42**	0.30**	0.45**	0.33**	0.49**	0.40**	0.48**	0.36**	0.34**	0.42**	0.45**	0.70**	0.37**	-		
16. SP 12	0.14	0.22*	0.76**	0.22*	0.31**	0.30**	0.82**	0.20*	0.24*	0.87**	0.36**	0.88**	0.33**	0.93**	0.38**	-	
17. AMB	0.64**	0.39**	0.28**	0.71**	0.47**	0.72**	0.33**	0.70**	0.60**	0.34**	0.54**	0.39**	0.62**	0.33**	0.72**	0.37**	-

Note. BE = behavioral experiments; AS = anxiety surfing; SP = SP-12 anxiety scores; SB = safety behaviors; FB = feedback; CB = core beliefs; AMB = Average task-related ambivalence. **Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed)

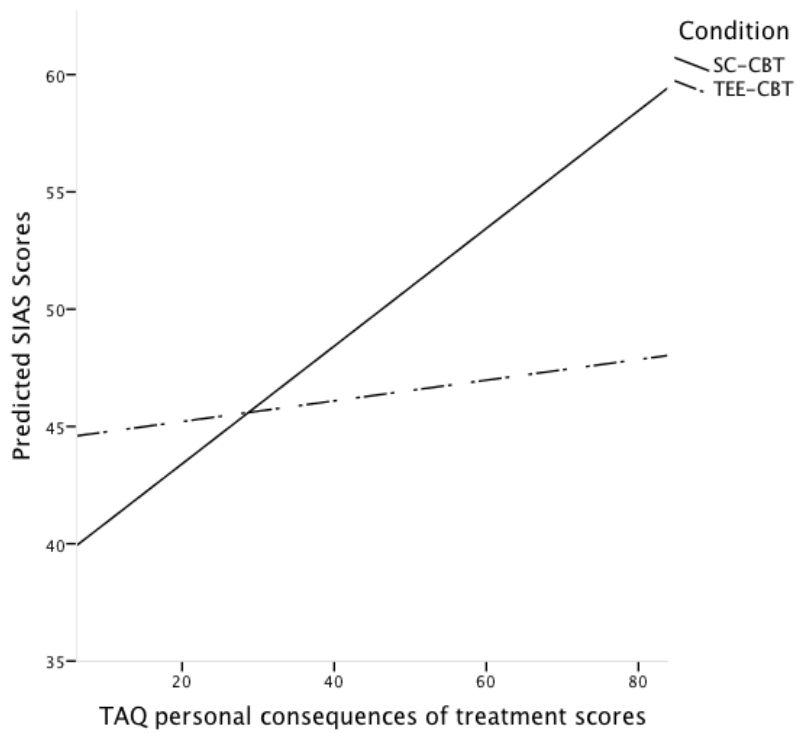


Figure 1. Plot of interaction between TAQ personal consequences of treatment and condition in predicting SIAS scores.

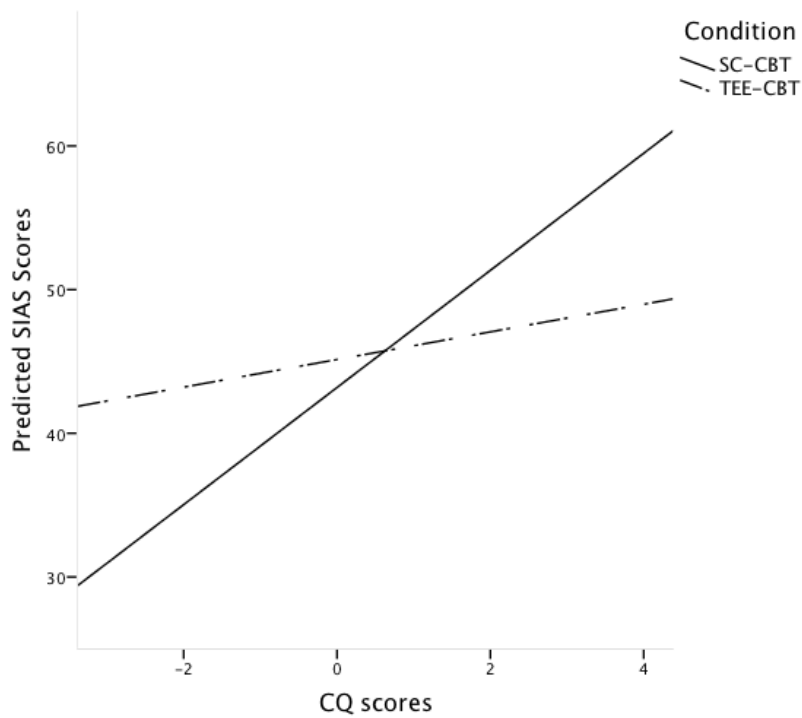


Figure 2. Plot of interaction between CQ scores and condition in predicting SIAS scores.

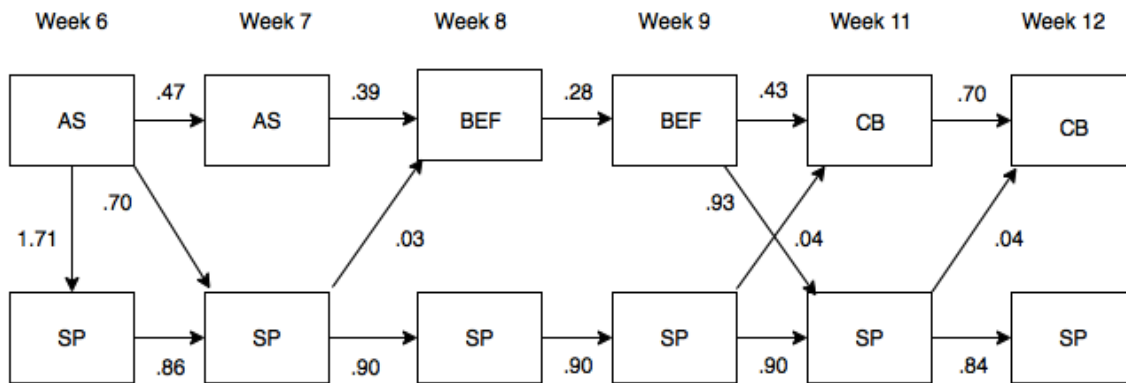


Figure 3. Cross-lagged model for the association between CBT task-related ambivalence and social anxiety. *Note.* AS = anxiety surfing; BEF = behavioral experiments with feedback; CB = core beliefs; SP = Social anxiety symptoms as rated by the SP-12. Numbers represent regression weights (β). Only paths which were significant or approached significance at the $p = .05$ level are presented.

The following chapter presents the paper entitled “Therapist and client interactions in MI for social anxiety disorder”. Chapter Five seeks to employ the transition analysis technique to investigate the bidirectional associations between therapist and client speech during MI sessions for social anxiety disorder (SAD), thus attempting to establish support for the first link of the MI causal model in the context of SAD.

Chapter 5

Therapist and client interactions in motivational interviewing for social anxiety disorder.

This chapter has been submitted for publication to Journal of Clinical Psychology. This is the revised version that has been re-submitted at the editor's request.

Author contribution:

Ms. Mia Romano was solely responsible for the design of the research, analysis and write-up of this paper. Ms. Jelena Arambasic was responsible for coding motivational interviewing therapy recordings. Dr. Peters provided statistical and research supervision.

Therapist and client interactions in motivational interviewing for social anxiety disorder.

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Abstract

Objective: The aim of the present study is to assess the bidirectional associations between therapist and client speech during a treatment based on Motivational Interviewing (MI) for social anxiety disorder. **Method:** Participants were 85 adults diagnosed with social anxiety who received MI prior to entering cognitive behavioral therapy. MI sessions were sequentially coded using the Motivational Interviewing Skill Code 2.5. **Results:** Therapist MI-consistent behaviors including open questions and positive and negative reflections were more likely to be followed by client change exploration (change talk and counter-change talk). Therapist MI-inconsistent behaviors were more likely to precede client neutral language. Client language was also found to influence therapist likelihood of responding in an MI-consistent manner. **Conclusions:** The findings support the first step of the MI causal model in the context of social anxiety and direct future research into the effect of therapist and client behaviors on MI treatment outcome.

Keywords. Change talk; therapist behaviors; sequential analysis; motivational interviewing processes; social anxiety disorder

It is well established that psychotherapy brings about change in client behavior and that there is a need to understand and explain how this change occurs. One process that may shed light on client change is to investigate the sequence of behavior during therapy sessions, however little research has examined how therapist and client behaviors interact and influence one another during treatment. The examination of behavioral sequences during therapy is relevant to uncovering the process of many therapeutic modalities, though it has most recently been examined in the context of Motivational Interviewing (MI). MI is a fundamentally client-centered approach that aims to increase client motivation for behavior change by exploring and resolving ambivalence (Miller & Rollnick, 1991, 2002, 2013). Meta-analytic research has provided support for the efficacy of MI in a variety of treatment domains, including substance abuse (Lundahl & Burke, 2009), health behaviors (Martins & McNeil), and gambling (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). There is also increasing evidence for the efficacy of MI as an adjunctive treatment for psychological disorders including anxiety and eating disorders (Arkowitz, Miller, & Rollnick, 2015).

MI is characterized by a particular spirit or “way of being” with clients that is fundamental to engaging the client in the change process. MI spirit involves a collaborative partnership between therapist and client, emphasis on the client’s autonomy and expertise in decisions about change, and evocation of the clients’ own reasons, motivations, and commitment for change (Miller & Rollnick, 2013). MI therapists employ client-centered counseling skills and specific therapeutic techniques to embody this MI spirit and also to strategically evoke the client’s own arguments for change (change talk; CT) (Miller & Rollnick, 2013). Research has demonstrated that both therapist and client behaviors that occur during MI therapy predict treatment outcome (Apodaca & Longabaugh, 2009; Copeland, McNamara, Kelson, & Simpson, 2015; Magill et al., 2014). Furthermore, a causal model has been proposed to account for the efficacy of MI, whereby therapist behaviors or skills influence client CT, and it is this CT that is predictive of outcome (Miller & Rose, 2009).

Meta-analytic research in the treatment of substance use and other health behaviors has provided support for this hypothesized causal model (Apodaca & Longabaugh, 2009; Copeland et al., 2015; Magill et al., 2014). Particularly, the research suggests that therapist behaviors that are consistent with MI, such as reflections and affirmations, are related to greater expression of CT, while MI-inconsistent responses, such as confrontation and warnings, have been related to fewer instances of CT and greater expression of language that argues for the status quo (counter change talk; CCT) or language unrelated to change (see, for example, Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Apodaca, Magill, Longabaugh, Jackson, & Monti, 2013; Catley et al., 2006; Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Gaume, Gmel, Faouzi, & Daeppen, 2008; Gibbons, Carroll, Ball, Nich, Frankforter, & Martino, 2010; Moyers & Martin, 2006; Moyers, Martin, Houck, Christopher, & Tonigan, 2009; Pirlott, Kisbu-Sakarya, Defrancesco, Elliot, & Mackinnon, 2012; Vader, Walters, Prabhu, Houck, & Field., 2010).

While most of the findings regarding therapist behaviors and their influence on CT are correlational in nature, experimental research, where therapists are instructed to use MI-consistent or MI-inconsistent behaviors, has also demonstrated that client language is strongly influenced by therapist responses, indicating a causal relationship between the two (Glynn & Moyers 2010, Miller, Benefield, & Tonigan, 1993, Patterson & Forgatch 1985). In order to assess further the temporal relationship between clinician and client behavior, researchers have examined the likelihood of particular client behaviors occurring after particular therapist behaviors using sequentially coded data about the interactions during MI therapy sessions (known as transition analyses). The findings appear to confirm that CT is more likely to occur following MI-consistent behaviors (MICO) and is less likely to occur following MI-inconsistent behaviors (MIIN) (D'Amico et al., 2014; Gaume et al., 2010; Gaume et al., 2008; Moyers et al., 2009). Furthermore, the findings show that MICO behaviors may lead to CCT, suggesting that therapist behaviors may influence client change exploration in general

(Apodaca et al., 2016; Gaume et al., 2010; Gaume et al., 2008; Moyers et al., 2009). There is also evidence that the valence of the reflection is meaningful during interactions, with CT more likely to follow positive reflections (reflections of CT) and CCT more likely to follow negative reflections (reflections of CCT) (D'Amico et al., 2014; Barnett et al., 2014; Moyers et al., 2009; Moyers, Houck, Glynn, & Manuel, 2011).

While both therapist and client behaviors during MI have been shown to predict treatment outcome, research examining the interaction between therapist and client behaviors suggests that it is the type and sequence of these behaviors during therapy that may be important. Determining the likelihood that certain therapist behavior will result in CT or CCT provides an opportunity for clinicians to emphasize behaviors that are more likely to elicit or reinforce CT and steer clear of those behaviors that may hinder discussion of change, potentially improving client outcome. Examining the sequence of behaviors also offers insight about how client speech may influence clinician behavior. For example, Gaume et al. (2010) found that MICO behaviors were more likely to occur after any type of change exploration (CT and CCT) while MIIN behaviors were more likely only after CCT. Providing clinicians with feedback about how they typically respond to CT and CCT could help pinpoint any missed opportunities to elicit and reinforce client change language and inhibit MI-inconsistent responding. Furthermore, new research has demonstrated that the momentum and pattern of the clients own language, in particular continuing to express CT following CT may be more important in predicting client outcome than the simple frequency of CT (Houck & Moyers, 2015). Thus, examination of these bidirectional relationships can provide an opportunity to improve training in MI skills and dissemination of effective MI practices.

To date, research examining therapist and client behaviors during MI has been conducted mostly in the realm of addictive behaviors. However, client change language and/or therapist behaviors during MI have also been shown to predict treatment outcome for

other target behaviors such as partner aggression (Woodin, Sotskova, & O’Leary, 2012), diet and exercise (Pirlott et al., 2012), and problem gambling (Hodgins, Ching, & McEwen, 2009). Given that MI is increasingly utilized as an adjunctive treatment for a variety of physical and mental health conditions, an examination of the bidirectional relationships in diverse problem areas is warranted. Yet, temporal analyses have not been conducted.

One area that MI has shown some promise is in the treatment of anxiety disorders. Research has demonstrated that MI may enhance treatment uptake, engagement and in some cases treatment outcome for anxiety disorders, including obsessive-compulsive disorder, generalized anxiety disorder (GAD), social anxiety disorder (SAD), and panic disorder (For example: Aviram & Westra, 2011; Barrera, Smith, & Norton, 2015; Maltby & Tolin, 2005; McCabe, Rowa, Antony, Young, & Swinson, 2008; Westra, Constantino, & Antony, 2016; Westra, Arkowitz, & Dozois, 2009, Westra & Dozois, 2006). Furthermore, there is evidence that MI has a positive impact on client within session behaviors, such as homework compliance and resistance, and that increases in homework compliance and decreases in resistance then impact positively on treatment outcome (Aviram & Westra, 2011; Constantino, Westra, & Antony, 2015; Westra et al., 2009; Westra & Dozois, 2006). Recent research has also pointed to the relevance of change language in anxious populations. In the context of an adjunctive MI-CBT treatment for GAD, clients who showed high levels of CCT early in treatment had significantly better long-term outcomes and showed continued improvement over time if they received MI-CBT as compared to CBT alone, where there was slippage of gains over time after treatment ended (Button, Westra, Constantino, & Antony, 2015). The relationship between an MI style and client behavior has also been demonstrated in an anxious population, where clients whose therapists used an MI style during moments of resistance in CBT had lower levels of post-treatment worry and subsequent resistance (Aviram, Westra, Constantino, & Antony, 2016). Moreover, greater therapist empathy during MI-CBT and CBT alone has been linked to worry reductions for individuals with generalized

anxiety (Constantino et al., 2015).

The research, therefore suggests that both therapist behaviors and change language may be important variables in the prediction of MI treatment outcome for anxiety disorders. The aim of the present study is, therefore to assess how therapist and client speech interact during MI sessions. The present study replicates previous research by examining bidirectional associations between clinician and client language and extends the MI literature to examine these associations in the context of MI treatment sessions prior to CBT for SAD. Based on previous substance use research, therapist MICO behaviors are expected to be more likely to precede client change language exploration (both CT and CCT), while MIIN behaviors are more likely to precede client CCT or language unrelated to change. Given the growing application of MI as an adjunctive treatment for anxiety disorders, sequential analyses may help to improve dissemination of MI in this area, and may offer insight into how MI may be tailored to suit particular mental health concerns. Moreover, it provides an opportunity to further test elements of the MI causal model in areas beyond substance use.

Method

Sample and Procedures

Participants were 85 adults (51 male; age: $M = 30.29$, $SD = 8.68$) with a primary diagnosis of SAD who presented for treatment at the Centre for Emotional Health Clinic, Macquarie University, Sydney during 2012-2015. Participants were drawn from an ongoing randomized controlled trial that examined the effect of MI pre-treatment prior to commencing a CBT group program. Participants contacted the Emotional Health Clinic through usual referral sources, including general practitioners, mental health professionals, occasional media coverage, and word of mouth. Telephone screening was conducted and those who emerged as

potentially having anxiety-related difficulties were invited for a thorough assessment, which included the completion of an online questionnaire and a structured diagnostic interview (the Anxiety Disorders Interview Schedule – IV; ADIS-IV; Di Nardo, Brown, & Barlow, 1994) administered by graduate psychology students and clinical psychologists. All participants met inclusion criteria for the RCT: they were over 18 years of age, had a primary diagnosis of SAD as measured by the ADIS-IV (Di Nardo et al., 1994), and a Clinician Severity Rating of 4 or above on a 0 to 8 scale (i.e., at least moderate impairment caused by SAD). Exclusion criteria were problems requiring immediate attention, such as, clear suicidal intent, severe substance abuse or dependence, and active psychosis. Concurrent pharmacotherapy was allowed, provided that dosages had been consistent for 3 months and there were no plans to change during the course of treatment.

The majority of the current sample identified Australia as their country of origin (72%). Twenty participants identified as belonging to another ethnic group (Chinese: $n = 7$; Italian: $n = 3$; ten participants identified with one each of the following ethnic groups; British, Hungarian, Indian, Korean, Latin American, Middle Eastern, Muslim, Nepalese, Persian, and Turkish.). Forty-eight percent of the sample were employed and 46% had attained a bachelors degree or higher. Self-reported anxiety severity ranged from 18 to 75 with a mean of 55.53 ($SD = 11.16$) as measured by the Social Interaction and Anxiety Scale (SIAS; Mattick & Clarke, 1998). The majority of the sample (58%) met criteria for at least one other Axis 1 diagnosis (GAD: $n = 26$, Major depressive disorder: $n = 22$, Specific phobia: $n = 14$, Dysthymia: $n = 8$, OCD: $n = 4$, and Other: $n = 4$)¹¹. Fifty-three percent of the sample also met criteria for Avoidant Personality Disorder. Twenty-nine participants were currently taking antidepressant or anxiety medication.

¹¹ The number of additional Axis 1 diagnoses does not equate to the percentage of the sample as some participants had more than one additional diagnosis.

All participants provided informed consent and the procedures were approved by the Macquarie University Human Research Ethics Committee.

Intervention

As part of the ongoing randomized controlled trial participants engaged in treatment conducted in two phases: phase one was either an MI-style intervention (called Treatment Expectation and Engagement (TEE)) designed to prepare participants for CBT or supportive counseling and phase two was the CBT intervention (details of CBT intervention are reported elsewhere; Rapee, Gaston, & Abbott, 2009). The current study will only examine the TEE intervention.

Phase one (TEE). Participants engaged in three one-hour sessions delivered individually by clinical psychologists or graduate clinical psychology students ($n = 15$). The sessions were designed as a preparatory treatment program to be conducted prior to CBT for SAD. The aim of the program was to address obstacles to full engagement with CBT for SAD, to enhance expectations about a positive outcome from CBT, and thereby, to enhance later outcomes from CBT. The TEE program extends some of the MI principles embodied in a program developed by Westra and Dozois (2008) to enhance engagement with treatment, but goes further to explicitly address expectations about CBT treatment for SAD. Sessions involved discussion of: ambivalence and motivation; life values and the discrepancy between current behavior and those values; obstacles to change; expectations about treatment process and outcome; and, self-efficacy. The TEE program incorporated MI principles of eliciting CT, expressing empathy, developing discrepancy, rolling with resistance, and supporting self-efficacy described by Miller and Rollnick (2002). During the TEE sessions participants were invited to engage in treatment exercises that helped to elicit costs and benefits of changing, identify values, and develop discrepancy. These elements were adapted from several sources including Forsyth and Eifert (2007) and Ciarrochi and Bailey (2008). Session One involved

discussion of ambivalence and motivation and a cost-benefit analysis of remaining anxious vs. engaging in treatment; Session Two involved discussion of values and eliciting of values-behaviors discrepancy; and, Session Three continued discussion of values-behavior discrepancy as well as detailed discussion of obstacles to and expectations for change, expectations of the treatment process, and boosting self-efficacy for change. All therapists carefully followed the manual-based protocol for the TEE sessions, with critical topics consistently introduced in the same order to all clients. However in keeping with the client-centered spirit of MI, progression through session material was largely dependent on the client's engagement with the material.

Therapists were final year post-graduate clinical psychology students and qualified clinical psychologists trained to deliver the TEE intervention. Therapists had general training in clinical psychology and delivery of a range of psychological interventions, but did not have a specific allegiance to MI. Training consisted of viewing videotaped and live TEE therapy sessions, conducting initial sessions while being observed by a senior clinical psychologist who provided feedback, and weekly supervision by a senior clinical psychologist that was centered around adherence to the study protocol. The training procedures were designed to mimic those that might routinely occur in practice.

Therapist MI proficiency

Therapist MI proficiency was evaluated against the Motivational Interviewing Treatment Integrity (MITI 3.1.1; Moyers, Martin, Manuel, Miller, & Ernst, 2010) recommended proficiency and competency standards for clinicians. Table 1 provides the MITI fidelity standards and fidelity measures for the sample used in this study.

<Insert Table 1>

Data for the current study was drawn from all available TEE session recordings ($n = 255$). Only one recording per participant was coded to avoid inflating the relationship between behaviors due to the fact that the same participant would be included more than once in the analysis. Thus, for each participant, one of the three TEE sessions was selected using a random number generator that allowed for an equal number of Session 1, 2, and 3 recordings. If a recording of the chosen session was not available (due to technical issues with the recording, for example), another session was chosen randomly. For six participants, no recordings were available to be included and therefore, these participants were excluded due to: inaudible or poor quality session recordings ($n = 4$); recording missing ($n = 1$); and client did not provide informed consent for recordings to be used in research ($n = 1$). The excluded participants were similar in demographic characteristics and anxiety severity compared to the coded sample. The final sample consisted of 79 TEE sessions, 26 recordings for Session 1 and 3, and 27 recordings for Session 2. The majority of sessions ranged in length from 40-60 minutes, with an average length of 52.44 minutes. There were four outlying sessions, two particularly short (23.36 and 24.44 minutes), and two particularly long (73.04 and 89.21 minutes). The discrepancy in length of sessions was due to two participants arriving late to the session (short sessions) and study administration occurring within the session (i.e., administering questionnaires rather than session content; long sessions). A one-way ANOVA was conducted to compare the length of TEE sessions ($F(2,72) = 3.95, p = .023$). Bonferroni post-hoc comparisons revealed that Session One ($M = 49.27, SD = 6.62$) was significantly shorter than Session Two ($M = 54.16, SD = 5.86$)¹².

Behavior Coding and Analysis Overview

Behavior coding and analyses were conducted in the following phases: 1) therapist and client behaviors during TEE sessions were coded according to coding procedures outlined below; 2) the inter-rater reliability of the coding instrument was assessed; 3) transition

¹² Outliers were removed from analyses comparing session length.

analyses were conducted to examine the temporal relationship between therapist and client behaviors during TEE sessions.

Behavior Coding

Client and therapist behaviors were coded using the Motivational Interviewing Skill Code 2.5 (MISC 2.5; Houck, Moyers, Miller, Glynn, & Hallgren, 2013) from the Center on Alcoholism, Substance Abuse and Addictions (<http://casaa.unm.edu/download/misc25.pdf>). The MISC 2.5 is an observational rating system that combines elements of the MISC 2.1 and the Sequential Code for Observing Process Exchanges (MI-SCOPE; Martin, Moyers, Houck, Christopher, & Miller, 2005). The MISC 2.5 draws together optimal elements of each system in order to capture specific therapist and client behaviors, including valenced therapist reflections, and also allows for sequential coding of MI sessions. It codes therapist and client language into mutually exclusive and exhaustive categories. Coding was performed in two passes. In the first pass, coders parsed the entire recording into utterances (thought units) and then completed a set of seven Likert rating scales to assess therapist interpersonal skill (Acceptance, Empathy, Collaboration, Autonomy Support, Evocation, and Direction) and client self-exploration. In the second pass, a different coder applied behavioral codes to each therapist and client utterance. Coding was conducted using the Center on Alcoholism Substance Abuse and Addictions (CASAA) Application for Coding Treatment Interactions (CACTI; Glynn, Hallgren, Houck, & Moyers, 2012). This software allows for automated parsing of session recordings, which ensures that all coders code the same utterance, thus increasing reliability. The system also stores sequential data pertaining to each utterance.

Client language. Using the MISC 2.5, each client utterance was categorized as either change talk (CT), counter change talk (CCT), or unrelated to change (follow/neutral/ask; FN). In coding CT, coders are required to know the target behavior for change before coding each recording (for example, cutting down on drinking). However, target behaviors in anxiety

treatment can vary greatly and may include a multitude of different areas for behavior change (Button, Westra, Hara, & Aviram 2014; Lombardi et al., 2014). For example in the context of SAD, behavior change targets may include things like reductions in avoidance, use of safety behaviors and self-focused attention, and altering negative thinking styles. Furthermore the TEE sessions had an additional focus of improving client expectations about the CBT program. Thus, in using the MISC 2.5 in the context of the TEE sessions, multiple social-anxiety related target behaviors were allowed, as well as those statements pertaining to expectations about the treatment program, for example, “I know long term this is the only way that works”. Each client CT utterance was classified as either commitment (e.g., “maybe I should set a certain time every day to just think over that day and write down anything that I’ve thought about, you know, negative thoughts that I’ve had”), taking steps (e.g., “... because I have difficulty public speaking, I joined the (toastmasters club)), reasons (e.g., “I just don’t get to see them or do as many things with them because of the way I am”), desire (e.g., “I want to be the person that has a good time, rather than the person who is freaking out”), ability (e.g., “I honestly couldn’t see myself failing to implement (the changes)”), need (e.g., “I know I can’t keep going the way I am so I just have to do this”), or “other” statements that do not fall under the previous CT categories (e.g., “obviously the only way to overcome is exposure, gradual exposure, and that’s why I was really keen to do the group program”). Components of CCT included statements counter to commitment (e.g., “I will probably retreat, I don’t know maybe turn off my phone and all communications for a day...”), taking steps (e.g., “but while I’m there I’ll avoid, like I’ll restrict the time that I have one on one conversations with people”), reasons (e.g., “it’s (change) going to be extremely uncomfortable and possibly painful emotionally”), desire (e.g., “I don’t want to have to put myself in difficult situations”), need (e.g., “if there’s some legitimate reason for me not to finish the (treatment program) then that’s ok, I don’t need to finish it”), ability (e.g., “I’m struggling with the confidence that I can do it, I’m really doubting that I can do it”), and

“other” statements that do not fall under the previous categories (e.g., “I just don’t know that I believe that it will actually get rid of, reduce the anxiety, the emotion, and the physical symptoms”).

Therapist behavioral skill counts. Each therapist utterance was assigned one of 17 behavioral skill codes consistent with the MISC 2.5. Utterances were coded as open questions or closed questions, and simple or complex reflections. Reflections were further coded based on the valence of the reflection. That is, if the reflection directed the conversation towards change it received a positive valence (+), if the reflection steered the conversation away from change it received a negative valence (-), or a combination of both (+/-). If the reflection was unrelated to change it received a neutral valence (0). The remaining codes were: affirm, support, reframe, emphasize control, advise with or without permission, raise concern with or without permission, confront, warn, direct, giving information, structure, filler, and facilitate.

Coders and reliability

Coders were one postgraduate and one undergraduate psychology student who were kept blind to the identity or pre-treatment severity and outcome status of the participants. Coders were trained in the use of the coding manual and software over a period of three months. Each coder was provided with about 50 hours of training, which focused on applying the MISC 2.5 and use of the CACTI system. Training consisted of (a) familiarization with MI literature; (b) detailed reading of the MISC 2.5, MITI, and CACTI manual; (c) coding and parsing pre-scored transcripts available from the Motivational Interviewing Network of Trainers (MINT) website (<http://www.motivationalinterviewing.org>); (d) coding and parsing TEE session recordings not used in the final sample until inter-rater reliability reached a criterion of .60 (indicating good agreement according to Cicchetti’s (1994) criterion); and (e) weekly meetings to discuss any coding issues and disagreements and to prevent coder drift. During the coding of the present study, any disagreements in coding decisions were resolved

by a supervisor (LP). In order to avoid bias in parsing, each coder parsed and coded half of the session recordings, so that those videos that one coder parsed, the other coded.

A random selection of 20% of TEE session recordings ($n = 16$) were double coded to assess inter-rater reliability. Cohen's kappa was used to assess reliability at the utterance level (pooling all sessions). Kappa values of .70 or higher reflect excellent agreement, .41 to .69 reflect acceptable agreement, and .40 and below reflect unacceptable agreement (Cohen, 1960). Reliability of frequencies for each code individually was then estimated with the intraclass correlation coefficient (ICC; Shrout & Fleiss, 1979). Cicchetti's (1994) criterion identifies ICC's below .40 as showing poor agreement, .40 to .59 as fair agreement, .60 to .74 as good agreement, and .75 as excellent agreement.

Analysis Plan

Transition Analysis. Conditional probabilities were calculated using the Generalized Sequential Querier (GSEQ) 5.1 software (Bakeman & Quera, 2002). Conditional probabilities measure the probability that a specified therapist behavior will precede a certain client behavior or vice versa. The probability is defined by the equation: $P(t|g) = P(t \text{ } g)/P(t)$, where t is the target and g is the given. Conditional probabilities were calculated based on all "same-type transitions", for example, if MICO was the given behavior and CT the target behavior, transitions were evaluated only among all therapist to client transitions but not with respect to all other possible transitions (such as client to therapist). Four contingency tables were constructed in which the given and target behaviors alternated; therapist-to-client transitions, client-to-therapist transitions, client-to-client auto-transitions, and therapist-to-therapist auto-transitions. Auto-transitions refer to transitions involving only the client or only the therapist (e.g., one client behavior transitions to a second client behavior). Therapist auto-transitions were computed for completeness of data tabulation but not analyzed further due to the scope of the study. For each contingency table the number of observed and expected

transitions was calculated between given and target codes. Expected transitions were calculated as the probability of the target behavior multiplied by the frequency of the given behavior, resulting in the number of occurrences expected if there were no association between the given and target codes. Conditional probabilities are calculated by dividing the observed number of transitions by the total number of transitions per given code (Bakeman & Quera, 1995).

Odds ratios (ORs) and confidence limits were calculated to determine whether observed transition frequencies deviated from expected transition frequencies more often than by chance (Bakeman & Quera, 1995). Transitions with ORs greater than 1 were considered more likely than expected by chance (meaning that on the odds ratio scale, the likelihood is greater to transition to this particular category vs. to some other category), whereas transitions with ORs smaller than 1 were less likely than expected to occur by chance.

The transition analysis of all codes showed that about 71% of all cells in the matrix had expected frequencies of less than five, which is the threshold for obtaining reliable estimates of transition probabilities (Wickens, 1982). Thus, six summary variables were created to encompass client and therapist codes. Client behaviors were summarized into: (a) CT, language towards change; (b) CCT, language away from change; and (c) FN, following and neutral utterances not related to changing anxiety behaviors. Therapist behaviors were summarized into behavior categories according to the MISC 2.5: (a) MICO behaviors (open questions, simple and complex reflections, affirm, support, reframe, emphasize control, advise with permission, and raise concern with permission); (b) MIIN behaviors (confront, warn, direct, advise without permission, and raise concern without permission); and (c) Other (closed questions, giving information, structure, filler, and facilitate)¹³.

¹³ In the MISC 2.5, codes for Reframe and Closed Questions are not categorised, thus these codes were placed in summary variables that fit according to MI literature (Miller & Rollnick, 2013)

In a secondary analysis, therapist behaviors were split into sub-categories to examine transitions between specific therapist behaviors and client language. Here, therapist reflections and questions were categorized separately from MICO and Other behaviors. The behaviors were summarized as such: (a) all reflections with a positive valence were collapsed into a positive reflection category (RPOS; reflections of CT); (b) all reflections of a negative valence were collapsed into a negative reflection category (RNEG; reflections of CCT); (c) combination reflections (+/-) were combined (RBOTH; reflections of both CT and CCT); (d) all neutral reflections were combined together (ROther); (e) open questions (OQ); (f) closed questions (CQ); (g) Other MICO (oMICO; comprised of affirm, support, advise with permission, raise concern with permission, reframe, and emphasize control); and Other (oOther; giving information, structure, filler, and facilitate). The MIIN behavior category and client language categories remained unchanged for the secondary analysis.

Results

Behavior frequencies

Descriptive statistics for MISC behavior codes for each session and overall are presented in Table 2. One-way ANOVA's with Bonferroni post-hoc comparisons were utilized to examine differences in behavior frequencies across conditions. To reduce the likelihood of making a Type 1 error as a result of multiple comparisons, significance was determined according to a Bonferroni adjusted p-value (.05/14). In general, the frequency of therapist and client behaviors were similar across sessions. However there were significant differences between sessions for client CCT, $F(2, 76) = 18.54, p < .001$, and FN, $F(2, 76) = 6.43, p = .003$, and therapist OQ, $F(2, 76) = 10.87, p < .001$, RNEG, $F(2, 76) = 26.39, p < .001$, and ROther, $F(2, 76) = 13.23, p < .001$. Post-hoc comparisons revealed that the frequency of CCT was lower in Session Two than Session One and Three, and the frequency

of FN was greater in Session Two than Session One. In terms of therapist behaviors, the frequency of OQ was lower in Session One than in Session Two and Three. Corresponding with the lower frequency of CCT in Session Two, the frequency of RNEG was lower in Session Two than Session One and Three, and the frequency of ROther was greater in Session Two than in Session One.¹⁴

<Insert Table 2>

Reliability Estimates

Reliability of utterance-to-utterance agreement among coders. Cohen's kappa for the overall MISC codes was .91, with the majority of kappa's falling in the good to excellent range (.55 to 1.00). Two behavior codes achieved a low level of agreement, one being Confront ($k = .33$) and one CCT language category (Negative taking steps: $k = .00$). Lower reliability on MIIN codes is consistent with past research and may be attributed to the low number of MIIN behaviors occurring in the dataset. Similarly, there were only three negative taking steps utterances, thus, a disagreement on this code is not unusual. Recoding MISC behaviors into six categories resulted in a Cohen's kappa of .93. Recoding therapist behaviors into nine categories also resulted in a Cohen's kappa of .93. These three values indicate excellent reliability between coders at the utterance level.

Reliability of frequencies for behavior categories. ICC's for recoding MISC behaviors into six categories and nine categories were in the fair to excellent range, as presented in Table 2.¹⁵

Transition analyses

¹⁴ Given that the frequencies of some MISC behavior categories differed by session number it was of interest to examine transitions in specific sessions. Analyses revealed that odd's ratios and conditional probabilities were in the same direction for each session. There were some differences in significance levels, which may be attributed to the fewer number of transitions available for analysis. Due to concerns about the reliability of analyses when transitions were infrequent we did not present the results of transition analyses by session.

¹⁵ ICC's for therapist global ratings used for MITI fidelity were also acceptable (Empathy = .670; Direction = .783; Autonomy Support = .533; Collaboration = .730; Evocation = .854).

The transition matrix consisted of 24,994 transitions from the 79 TEE sessions. There were 9,317 therapist to client transitions, 9,297 client to therapist transitions, 2,121 client auto-transitions, and 4,259 therapist auto-transitions (not analyzed further). Within the transition matrix there were very few transitions involving MIIN behaviors (398), however given the theoretical interest of these behaviors to MI, the category was retained for analysis. Details of each transition analysis are discussed further below.

Primary analysis. Table 3 provides observed and expected frequencies, conditional probabilities (with significance levels), and odds ratios with corresponding confidence limits. Results for the primary analyses showed that MICO behaviors were more likely to be followed by any type of change language, either towards (CT) or away from change (CCT) and less likely to be followed by neutral language (FN). MIIN behaviors were more likely to be followed by FN, and less likely to be followed by CT. Other therapist behaviors were also more likely to be followed by FN, and less likely to be followed by CT/CCT.

With regard to client-to-therapist transitions, when clients made any type of change exploration (CT/CCT) therapists were more likely to respond with MICO behaviors and less likely to follow with Other behaviors. Therapists were also less likely to follow CT with MIIN behaviors. Neutral client language was more likely to be followed by MIIN or Other therapist behaviors and less likely to be followed by MICO.

Examination of client-to-client transitions showed that CT was more likely to be followed by another CT utterance and less likely to be followed by CCT, whereas CCT was more likely to be followed by CCT, and less likely to be followed by CT.

<Insert Table 3>

Secondary analysis. Results for the secondary analysis are presented in Table 4. As the MIIN behavior category was not split into subcategories, the results remained as per the primary

analysis and have not been re-presented in Table 4. Open questions, RNEG, and RPOS were the only behavior categories that were more likely than expected by chance to be followed by change exploration (CT/CCT). Both CT and CCT were more likely to follow open questions, however for therapist reflections the valence of the reflection was important. That is, RPOS was 4 times more likely to be followed by CT, while RNEG was 9 times more likely to be followed by CCT. Similarly, neutral reflections (ROther) were more likely to be followed by FN, as were Other behaviors, oMICO, and closed questions.

With therapist behaviors as targets, again the valence of the reflection was important. Reflections of CT (RPOS) were 13 times more likely to follow CT, while negative reflections (RNEG) were 34 times more likely to follow CCT. Reflections of both were 2 times more likely to follow CT, and 7 times more likely to follow CCT. While neutral reflections were 14 times more likely to follow neutral client language (FN). In terms of other MICO behaviors, open questions were the only behavior to be more likely to follow CT, though they were less likely to follow CCT. As a separate category, closed questions were also found to be less likely to follow CT and CCT and more likely to follow FN. The remaining behavior category (Other) was less likely to follow CT/CCT and more likely to follow FN.

<Insert Table 4>

Discussion

The current study is the first to investigate the bidirectional relationship between therapist and client speech during an MI intervention for socially anxious clients. Consistent with the proposed causal chain of MI, therapist MICO behaviors were more likely to precede client CT, while MIIN behaviors were more likely to precede neutral client language and less likely to precede client CT. MICO behavior was also more likely to precede CCT, suggesting

that it may facilitate change exploration in general. When clients made any type of change exploration utterance, it was more likely to be followed by MICO therapist behaviors. Talk towards change (CT) was less likely to be followed by MIIN behaviors, while neutral language was more likely to be followed by MIIN or Other therapist behavior. This finding suggests that language used by socially anxious clients may impact therapist responses and thus, in turn, impact their own level of change exploration. These results are important, given the proposed causal chain of MI and indicate the replicability of the causal chain across disorders.

The findings align with previous research examining behavior transitions during MI therapy, albeit within substance using populations (Apodaca et al., 2016; D'Amico et al., 2014; Gaume et al., 2008; Gaume et al., 2010; Moyers et al., 2009) and also highlight the importance of the valence of the reflection as demonstrated by D'Amico et al. (2014), Barnett et al. (2014), Moyers et al. (2009, 2011). In the current sample positive reflections were more likely to both precede and follow CT, while negative reflections were more likely to precede and follow CCT. However, the likelihood of responding to CCT with a negative reflection was much greater than the likelihood of following CT with a positive reflection, which indicates that perhaps TEE therapists were not always sensitive to the role of softening or sidestepping CCT. In examining frequencies of positive and negative reflections, though, reflections of CT were two times more prominent in TEE sessions, suggesting that overall therapists were reflecting more CT than CCT. Reflections that included both a positive and negative valence (RBOOTH) were more likely to follow both types of change language, however clients did not tend to follow RBOOTH with either CT or CCT. Interestingly, though the frequency of RBOOTH was rare, these therapist utterances tended to follow CCT more often than CT. This might indicate that TEE therapists were attempting to positively reframe client language that maintains the status quo, reflecting negative language back to the client with a positive inclination (towards change). While CCT may represent active change

exploration and is useful in helping clients to explore ambivalence about change, it has been linked to worse client outcome in both health and substance use domains (Magill et al., 2014) and anxious populations in the context of CBT (Lombardi et al., 2014). One of the main goals of MI is for therapists to use MICO behaviors, such as reflections, in order to steer the conversation away from maintaining the status quo (CCT) towards the expression of positive change language in order to help clients “talk themselves into change” (Miller & Rollnick, 2002, 2013). Barnett et al. (2014) demonstrated that when a client offered CCT and the therapist responded with a positive reflection, this increased the likelihood of positive change language from the client. In the current study clients were also more likely to respond to positive reflections with CT. Thus, a clinical implication of the current research is that TEE therapists could perhaps be further trained to be more sensitive to softening and positively reframing CCT utterances. Softening CCT is particularly pertinent given findings that CCT as opposed to CT has been shown to predict treatment outcome (Apodaca et al., 2014). Future research in the context of social anxiety could investigate the potential for therapist reframing utterances to influence client language toward or away from change. Also, examining whether therapists use reflections differently across TEE sessions may be useful. While using reflections of CCT may be beneficial in the first instance to help clients explore ambivalence, the aim would be to work towards resolving ambivalence and facilitating more expression of CT, whereby greater reframing and positive reflections may be expected towards the end of the session. The effectiveness of open questions on eliciting change language throughout the session could also be examined. For example, one study found that open questions suppressed CT at the beginning of a group MI session, but enhanced CT at the end of the session (Houck et al., 2016).

Although MICO behaviors were generally more likely to precede change language, the secondary analysis suggested that reflections and open questions in particular related to the expression of CT and CCT within the context of social anxiety, while other MICO

behaviors (affirm, emphasize control, advise and raise concern with permission, reframe, and support) may not be so influential. These findings correspond with past research (e.g., D’Amico et al., 2014; Moyers et al., 2009) and also the theoretical importance of reflective language in MI, given that reflections highlight clinician empathic awareness and can also be used to differentially reinforce aspects of client speech, in this case CT and CCT. Other MICO behaviors may be more relevant in terms of the general therapeutic environment, that is, establishing rapport and developing a collaborative and supportive partnership, thus may not be used differentially in response to client language. For example, therapists are likely to express support for any difficulties that a client experiences, and not necessarily only those related to anxiety. In concordance with MI theory, MIIN behaviors were less likely to both precede and follow CT. It was unexpected that MIIN behaviors did not significantly transition to CCT utterances, as demonstrated in previous research (Gaume et al., 2010; Moyers & Martin, 2006). However, MIIN behaviors were more likely to both precede and follow client neutral language, a finding consistent with the research of Gaume et al. (2008). One explanation that aligns with the views of Gaume et al. (2008) is that, within the current study, CCT was not viewed as an undesired client behavior but instead evidence of active self-exploration in regard to change, and particularly CCT was investigated in order to highlight potential roadblocks to change that may need to be overcome in order to fully engage in the subsequent CBT program. Given that CCT, like CT was viewed as evidence of client change exploration perhaps this affected the chances that therapists would respond in an MI-inconsistent manner as seen in Gaume et al. (2010). The variation in findings may also be related to the study context. For example, when therapists behave in an MI-inconsistent manner, socially anxious clients may be more likely to respond with neutral language as opposed to a more assertive response that takes the form of resistance to change. Furthermore, in the current study coding of “borrowed CT/CCT” was conservative. “Borrowed” change language is where a client’s response can be taken to reflect an inclination towards or away

from change based on the preceding therapist utterance. For example, if a therapist says; “so you really want to change”; and the client responds; “yes”, this could constitute a code of CT. Coders were careful to code such responses as CT or CCT because it was felt that in a socially anxious population it is more difficult to disentangle whether the client is expressing their true feelings or thoughts about the situation or perhaps just acquiescing to the therapist behavior given concerns about being judged or embarrassed by others. Thus, where it might be the case in previous research that such responses were interpreted as an inclination towards or away from change, it was not as clear-cut in this context, which may contribute to the difference in findings. One method that may help to navigate this issue in future might be to compare observer-rated CT and CCT with client self-report measures of CT and CCT (e.g., decisional balance worksheets), as clients might be more comfortable to express their true feelings in a worksheet format. It was promising though that client-to-client transition results were in line with past research (D’Amico et al., 2014; Gaume et al., 2010). The finding that CT was more likely to transition to CT, and CCT to CCT is important as it suggests that an initial CT (or CCT) utterance might spur client discussion of reasons to change (or not change). If therapists are able to nudge the conversation in the direction of change then clients may respond with multiple CT utterances, which could bolster motivation. Alternatively, therapists could attempt to sidestep or reframe continuous CCT utterances. Emphasizing CT-to-CT transitions may be particularly useful as such transitions have been shown to predict better treatment outcome (Houck & Moyers, 2015).

The significance of the current study lies in the use of a socially anxious population. This is the first attempt to examine therapist and client behaviors during MI therapy for clients with social anxiety and the first study of behavioral transitions during MI in a treatment program not designed for substance use. Furthermore, it provides preliminary evidence that the MI causal model may translate across treatment domains beyond addictions and health behaviors to include other mental health problems. A further strength is that reliability ratings

were generally in the excellent range, demonstrating that the MISC can be clearly interpreted in coding therapist and client behaviors during TEE sessions for social anxiety.

The results do, however, need to be interpreted in the light of limitations. There were very few observed transitions involving MIIN behaviors and RBOTH, which limits the ability to make definitive conclusions about these transitions. Similarly, despite the large number of transitions overall, there were too few transitions to examine each behavior code separately. A greater sample of coded recordings would allow for more detailed analyses of specific therapist behavior codes and client language, and perhaps an opportunity to also examine categories of client CT and CCT. Furthermore, while coders achieved adequate reliability, only two passes of each session were performed (as opposed to three suggested for new coders), thus the findings would need to be replicated in a study using expert coders. In relation to the analysis technique, although conditional probabilities do represent a time sequence they only measure the association between them, and not whether one causes the other. Thus, experimental research that manipulates therapist and client responses in an MI context is warranted in order to establish a causal relationship. Also, these analyses do not control for any other variable, for example the likelihood of a client response may be attributable to another factor for example client ambivalence, and particularly in the context of SAD, severity of symptoms which may impact on how the client responds and whether they respond at all. Given that the current sample was treatment seeking it is possible that clients were relatively motivated, at least more so than those individuals who do not initiate treatment, which limits the findings to a treatment-seeking sample. In line with this there may be differences related to the individual therapists, while they all received the same training and supervision, they differed in levels of counseling experience and proficiency in MI, which may influence in-session behaviors and response styles. A related point is that MI proficiency was not achieved for all MITI standards, which may call the fidelity of the MI into question. However, the training provided in the larger randomized controlled trial was designed to

mimic MI training that might be used in general clinical practice, and it is promising that the results are comparable to studies that have employed more experienced MI therapists. A final limitation is that there was no examination of how therapist/client behavioral transitions may have impacted client engagement behaviors in the CBT treatment that followed the TEE sessions. Nevertheless, the results of the transition analyses do indicate a temporal relationship between therapist and client behaviors during the TEE sessions, which are relevant to the process of MI therapy.

Conclusion

The current study particularly highlights the bidirectional association between therapist reflections and client language, and between client responses and therapist likelihood of responding in an MI-consistent manner. The findings support the first step of the MI causal model in the context of social anxiety and direct future research into the effect of therapist and client behaviors on TEE treatment outcome, and the role of client language as a mediator. Furthermore, though the current research is conducted in the context of MI for social anxiety, examining bidirectional associations between therapist and client speech offers insight into the therapy process more generally and informs an understanding of how therapeutic interactions may be assessed in a range of therapeutic modalities.

References

- Amrhein, P. C., Miller, W. R., Yahne, C. E., Palmer, M., & Fulcher, L. (2003). Client commitment language during motivational interviewing predicts drug use outcomes. *Journal of Consulting and Clinical Psychology, 71*, 862–878. doi:10.1037/0022-006X.71.5.862
- Apodaca, T. R., Borsari, B., Jackson, K. M., Magill, M., Longabaugh, R., Mastroleo, N. R., & Barnett, N. P. (2014). Sustain talk predicts poorer outcomes among mandated college student drinkers receiving a brief motivational intervention. *Psychology of Addictive Behaviors, 28*, 631–638. doi: 10.1037/a0037296
- Apodaca, T. R., Jackson, K. M., Borsari, B., Magill, M., Longabaugh, R., Mastroleo, N. R., & Barnett, N. P. (2016). Which individual therapist behaviors elicit client change talk and sustain talk in motivational interviewing. *Journal of Substance Abuse Treatment, 61*, 60 – 65. doi: 10.1016/j.jsat.2015.09.001
- Apodaca, T. R., & Longabaugh, R. (2009). Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction, 104*, 705–715. doi:10.1111/j.1360-0443.2009.02527.x.
- Apodaca, T. R., Magill, M., Longabaugh, R., Jackson, K. M., & Monti, P. M. (2013). Effect of a significant other on client change talk in motivational interviewing. *Journal of Consulting and Clinical Psychology, 81*, 35–46. doi:10.1037/a0030881
- Arkowitz, H., Miller, W. R., & Rollnick, S. (Eds.). (2015). *Motivational interviewing in the treatment of psychological problems*. (2nd ed.). New York: Guilford Press.
- Aviram, A., & Westra, H. A. (2011). The impact of motivational interviewing on resistance in cognitive behavioral therapy for generalized anxiety disorder. *Psychotherapy Research, 21*,

698–708. doi:10.1080/10503307.2011.610832

- Aviram, A., Westra, H. A., Constantino, M. J., & Antony, M. M. (2016). Responsive management of early resistance in cognitive-behavioral therapy for generalized anxiety disorder. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000100
- Bakeman, R., & Quera, V. (1995). *Analyzing interaction: Sequential analysis with SDIS & GSEQ*. Cambridge, United Kingdom: Cambridge University Press.
- Bakeman, R., & Quera, V. (2002). *GSEQ: Software for the analysis of interaction sequences*. Retrieved from <http://www2.gsu.edu/~psyab/gseq/Download.html>
- Barrera, T. L., Smith, A. H., & Norton, P. J. (2015). Motivational interviewing as an adjunct to cognitive behavioral therapy for anxiety. *Journal of Clinical Psychology*, 0, 1-10. doi: 10.1002/jclp.22239
- Barnett, E., Spruijt-Metz, D., Moyers, T. B., Smith, C., Rohrbach, L. A., Sun, P., Sussman, S. (2014). Bidirectional relationships between client and counselor speech: The importance of reframing. *Psychology of Addictive Behaviors*. Advance online publication. doi: 10.1037/a0036227
- Button, M. L., Westra, H. A., Constantino, M. J., & Antony, M. M. (2015). *Client motivation as a moderator of treatment outcomes in MI-CBT for generalized anxiety*. In H. A. Westra and M. J. Constantino (Moderators), An allegiance controlled RCT of MI-CBT for generalized anxiety. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.
- Button, M. L., Westra, H. A., Hara, K. M., & Aviram, A. (2014). Disentangling the impact of resistance and ambivalence on therapy outcomes in cognitive behavioral therapy for

generalized anxiety disorder. *Cognitive Behavior Therapy*. Published online.

doi:10.1080/16506073.2014.959038

Catley, D., Harris, K. J., Mayo, M. S., Hall, S., Okuyemi, K. S., Boardman, T., & Ahluwalia, J. S.

(2006). Adherence to principles of motivational interviewing and client within-session behavior. *Behavioral and Cognitive Psychotherapy*, 34, 43

56. doi:10.1017/S1352465805002432

Ciarrochi, J. V., & Bailey, A. (2008). *A CBT Practitioner's Guide to ACT: How to Bridge the Gap Between Cognitive Behavioral Therapy and Acceptance and Commitment Therapy*. Oakland, CA: New Harbinger Publications.

Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and

standardized assessment instruments in psychology. *Psychological Assessment*, 6, 284–290.

doi:10.1037/1040-3590.6.4.284

Cohen, J. A. (1960). Coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20, 37– 46. doi:10.1177/001316446002000104

Constantino, M. J., Westra, H. A., & Antony M. M (2015). *Mediators of treatment effects in a randomized controlled trial testing the efficacy of augmenting CBT with motivational interviewing for severe generalized anxiety disorder*. In H. A. Westra and M. J. Constantino (Moderators), An allegiance controlled RCT of MI-CBT for generalized anxiety. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.

Copeland, L., McNamara, R., Kelson, M., & Simpson, S. (2015). Mechanisms of change within motivational interviewing in relation to health behaviors outcomes: A systematic review.

Patient Education and Counseling, 98, 401-411. doi:10.1016/j.pec.2014.11.022

- D'Amico, E.J., Houck, J.M., Hunter, S.B., Miles, J.N.V., Osilla, K.C., Ewing, B.A., 2015. Group motivational interviewing for adolescents: Change talk and alcohol and drug outcomes. *Journal of Consulting and Clinical Psychology*, 83, 68–80. Advance online publication. <http://dx.doi.org/10.1037/a0038155>
- Di Nardo, P., Brown, T., & Barlow, D. (1994). *Anxiety Disorders Interview Schedule for DSM-IV - Lifetime version*. Albany, NY: Graywind Publications.
- Forsyth, J. P., & Eifert, G. H. (2007). *The mindfulness and acceptance workbook for anxiety*. Oakland, CA: New Harbinger Publications.
- Gaume, J., Bertholet, N., Faouzi, M., Gmel, G., & Daeppen, J. B. (2010). Counselor motivational interviewing skills and young adult change talk articulation during brief motivational interventions. *Journal of Substance Abuse Treatment*, 39, 272– 281. doi:10.1016/j.jsat.2010.06.010
- Gaume, J., Gmel, G., Faouzi, M., & Daeppen, J. B. (2008). Counselor behaviors and patient language during brief motivational interventions: A sequential analysis of speech. *Addiction*, 103, 1793–1800. doi:10.1111/j.1360-0443.2008.02 337.x
- Gibbons, C. J., Carroll, K. M., Ball, S. A., Nich, C., Frankforter, T. L., & Martino, S. (2010). Community program therapist adherence and competence in a motivational interviewing assessment intake session. *The American Journal of Drug and Alcohol Abuse*, 36, 342–349. doi:10.3109/00952990.2010.500437
- Glynn, L. H., Hallgren, K. A., Houck, J. M., & Moyers, T. B. (2012). CACTI: Free, Open-Source Software for the Sequential Coding of Behavioral Interactions. *PLoS ONE*, 7, e39740. doi:10.1371/journal.pone.0039740
- Glynn, L. H., & Moyers, T. B. (2010). Chasing change talk: The clinician's role in evoking client

- language about change. *Journal of Substance Abuse Treatment*, 39, 65–70. doi:10.1016/j.jsat.2010.03.012
- Hodgins, D. C., Ching, L. E., & McEwen, J. (2009). Strength of commitment language in motivational interviewing and gambling outcomes. *Psychology of Addictive Behaviors*, 23, 122-30. doi: 10.1037/a0013010
- Houck, J., Hunter, S., Benson, J. G., Cochrum, L. L., Rowell, L. N., & D’Amico, E. J. (2016). Temporal variation in facilitator and client behavior during group motivational interviewing sessions. *Psychology of Addictive Behaviors*, 29, 941 - 949. doi: 10.1037/adb0000107
- Houck, J., & Moyers, T. B. (2015). Within-session communication patterns predict alcohol treatment outcomes. *Drug and Alcohol Dependence*, 157, 205 – 209. doi:10.1016/j.drugalcdep.2015.10.025
- Houck, J., Moyers, T. B., Miller, W. R., Glynn, L., & Hallgren, K. (2013). *Motivational Interviewing Skill Code 2.5*. Retrieved from <http://casaa.unm.edu/download/misc25.pdf>
- Lombardi, D. R., Button, M. L., Westra, H. A. (2014). Measuring motivation: Change talk and counter-change talk in cognitive behavioral therapy for generalized anxiety. *Cognitive Behavior Therapy*, 43, 12-21. doi: 10.1080/16506073.2013.846400
- Lundahl, B. W., & Burke, B. L. (2009). The effectiveness and applicability of motivational interviewing: A practice-friendly review of four meta-analyses. *Journal of Clinical Psychology: In Session*, 65, 1232–1245. doi:10.1002/jclp.20638
- Lundahl, B. W., Kunz, C., Brownell, C., Tollefson, D., & Burke, B. L. (2010). A meta-analysis of motivational interviewing: Twenty-five years of empirical studies. *Research on Social Work Practice*, 20, 137–160. doi:10.1177/1049731509347850
- Magill, M., Gaume, J., Apodaca, T. R., Walthers, J., Mastroleo, N. R., Borsari, B., & Longabaugh,

- R. (2014). The technical hypothesis of motivational interviewing: A meta-analysis of MI's key causal model. *Journal of Consulting and Clinical Psychology*, 82, 973-983 doi: 10.1037/a0036833
- Maltby, N., & Tolin, D. F. (2005). A brief motivational intervention for treatment-refusing OCD patients. *Cognitive Behavior Therapy*, 34, 176–184. doi:10.1080/ 16506070510043741.
- Martins, R. K., & McNeil, D. W. (2009). Review of motivational interviewing in promoting health behaviors. *Clinical Psychology Review*, 29, 283–293. doi:10.1016/j.cpr.2009.02.001
- Martin, T., Moyers, T. B., Houck, J. M., Christopher, P. J., & Miller, W. R. (2005). Motivational interviewing sequential code for observing process exchanges (MI-SCOPE) coder's manual. Retrieved from <http://casaa.unm.edu/download/scope.pdf>
- Mattick, R. P., & Clarke, C. J. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behavior Research and Therapy*, 36, 455-470. doi: 10.1016/S0005-7967(97)10031-6
- McCabe, R. E., Rowa, K., Antony, M. M., Young, L., & Swinson, R. P. (2008). *Using motivational interviewing to augment treatment outcome with exposure and response prevention for obsessive compulsive disorder: Preliminary findings*. In H. A. Westra (Chair), Using motivational interviewing and motivational enhancement to engage individuals with cognitive behavioral therapy for anxiety. Symposium presented at the meeting of the Association for Behavioral and Cognitive Therapies, Orlando, FL.
- Miller, W. R., Benefield, R. G., & Tonigan, J. S. (1993). Enhancing motivation for change in problem drinking: A controlled comparison of two therapist styles. *Journal of Consulting and Clinical Psychology*, 61, 455–461. doi:10.1037/ 0022-006X.61.3.455
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change*

- addictive behavior*. New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York: Guilford Press.
- Miller, W. R., & Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist*, 64, 527–537. doi:10.1037/a0016830
- Moyers, T. B., & Martin, T. (2006). Therapist influence on client language during motivational interviewing sessions. *Journal of Substance Abuse Treatment*, 30, 245–251.
- Moyers, T. B., Houck, J. M., Glynn, L. H., & Manuel, J. K. (2011). *Can specialized training teach clinicians to recognize, reinforce, and elicit client language in motivational interviewing?* Presented at the 34th annual meeting of the Research Society on Alcoholism National Conference, Atlanta, GA.
- Moyers, T. B., Martin, T., Houck, J. M., Christopher, P. J., & Tonigan, J. S. (2009). From In-session behaviors to drinking outcomes: A causal chain for motivational interviewing. *Journal of Consulting and Clinical Psychology*, 77, 1113–1124. doi:10.1037/a0017189.supp
- Moyers, T. B., Martin, T., Manuel, J. K., Miller, W. R., & Ernst, D. (2007). *Manual for the revised global scales: Motivational interviewing treatment integrity 3.1.1 (MITI 3.1.1)*. Retrieved from http://casaa.unm.edu/download/MITI3_1.pdf
- Patterson, G. R., & Forgatch, M. S. (1985). Therapist behavior as a determinant for client noncompliance: A paradox for the behavior modifier. *Journal of Consulting and Clinical Psychology*, 53, 846–851. doi:10.1037/0022-006X.53.6.846
- Pirlott, A. G., Kisbu-Sakarya, Y., Defrancesco, C. A., Elliot, D. L., & Mackinnon, D. P. (2012).

Mechanisms of motivational interviewing in health promotion: A Bayesian mediation analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 69.
doi:10.1186/1479-5868-9-69

Rapee, R., Gaston, J., & Abbott, M. (2009). Testing the efficacy of theoretically-derived improvements in the treatment of social phobia. *Journal of Consulting and Clinical Psychology*, 77, 317-327. doi: 10.1037/a0014800

Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, 86, 420–428. doi: 10.1037/0033-2909.86.2.420

Westra, H. A., Arkowitz, H., & Dozois, D. J. (2009). Adding a motivational interviewing pretreatment to cognitive behavioral therapy for generalized anxiety disorder: A preliminary randomized controlled trial. *Journal of Anxiety Disorders*, 23, 1106–1117.
doi:10.1016/j.janxdis.2009.07.014

Westra, H. A., Constantino, M. J., & Antony M. M (2016). Integrating motivational interviewing with cognitive-behavioral therapy for severe generalized anxiety disorder: An allegiance-controlled randomized clinical trial. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000098

Westra, H. A., & Dozois, D. J. A. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and Research*, 30, 481–498. doi:10.1007/s10608-006-9016-y

Westra, H., & Dozois, D. (2008). Integrating motivational interviewing into the treatment of anxiety. In H. Arkowitz, et al. (Eds.). *Motivational interviewing in the treatment of psychological problems*. New York: Guilford.

Wickens, T. D. (1982). *Models for behavior: Stochastic processes in psychology*. San Francisco:

W. H. Freeman & Co.

Woodin, E. M., Sotskova, A., & O’Leary, K. D. (2012). Do motivational interviewing behaviors predict reductions in partner aggression for men and women? *Behavior Research and Therapy*, 50, 79–84. doi:10.1016/j.brat.2011.11.001

Vader, A. M., Walters, S. T., Prabhu, G. C., Houck, J. M., & Field, C. A. (2010). The language of motivational interviewing and feedback: Counselor language, client language, and client drinking outcomes. *Psychology of Addictive Behaviors*, 24, 190–197. doi:10.1037/a0018749

Table 1.

Motivational Interviewing (MI) fidelity results

	MITI fidelity standard	Sample average	<i>SD</i>
Percent MI-Adherent	90%	84%	12.26
Percent open question	50%	44%	12.71
Percent complex reflection	40%	58%	12.95
Reflection-to-question ratio	1.0	.75	.41
Empathy	Average of 3.5	4.56	.64
Direction	Average of 3.5	4.56	.69
MI Spirit	Average of 3.5	4.00	.53

Note. MITI = Motivational Interviewing Treatment Integrity. MI Spirit represents an average of three therapist global ratings (Autonomy Support, Evocation, and Collaboration). Fidelity measures were calculated using existing MISC 2.5 data and then compared with MITI fidelity standards. The MITI standard represents that for beginning proficiency.

Table 2

Descriptive statistics for MISC summary variables by session and across all sessions (N = 79)

Summary variable	Session 1	Session 2	Session 3	All Sessions			
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	Min	Max	<i>M (SD)</i>	ICC
CT	39.85 (21.57)	33.93 (19.17)	41.69 (23.39)	4	90	38.43 (21.40)	.959
CCT	17.38 (8.73)	5.74 (6.90)	21.92 (14.90)	0	60	14.90 (12.04)	.994
FN	72.73 (29.59)	109.56 (48.56)	92.31 (30.31)	26	217	91.76 (39.90)	.971
MICO	78.35 (24.18)	88.74 (29.35)	89.54 (27.71)	31	179	85.58 (27.32)	.990
MIIN	2.92 (4.14)	6.26 (8.95)	5.96 (3.24)	0	35	5.06 (6.15)	.533
Other	76.73 (26.37)	85.67 (39.33)	83.50 (23.30)	33	171	82.01 (30.45)	.965
OQ	15.23 (6.44)	28.70 (13.02)	27.42 (13.71)	4	65	23.85 (12.93)	.993
CQ	30.62 (14.67)	34.00(17.42)	28.12 (12.15)	7	69	30.95 (14.94)	.987
RPOS	14.62 (7.17)	12.26 (8.02)	15.15 (7.68)	1	36	13.99 (7.65)	.937
RNEG	9.19 (5.22)	1.41 (2.10)	7.38 (4.37)	0	23	5.94 (.08)	.887
RBOTH	1.77 (1.42)	.96 (1.48)	.73 (1.40)	0	6	1.15 (1.49)	.982
ROther	9.31 (3.61)	20.96 (11.40)	13.88 (7.84)	1	50	14.80 (9.52)	.937
oMICO	28.23 (16.20)	24.44 (14.50)	24.96 (12.25)	3	85	25.86 (14.32)	.956
oOther	46.12 (15.77)	51.67 (25.73)	55.38 (17.46)	22	102	51.06 (20.31)	.899

Note. CT = change talk; CCT = counter-change talk; FN = follow/neutral; MICO = MI-consistent behavior; MIIN = MI-Inconsistent behavior; OQ = open questions; CQ = closed questions; RPOS = reflections of change talk; RNEG = reflections of counter-change talk; RBOTH = reflections of both change talk and counter-change talk; ROther = reflections of neutral client language; Other = comprised of closed questions, giving information, structure, filler, and facilitate; oMICO = comprised of affirm, support, advise with permission, raise concern with permission, reframe, and emphasize control; oOther = comprised of facilitate, filler, giving information, and structure. ICC = intraclass correlation, computed for a subset of sessions ($n = 16$) coded by two coders.

Table 3.

Primary transition analysis

Initial event → subsequent event	Observed frequency	Expected frequency	Conditional probability	Odds ratio	Confidence limits
Therapist-to-client transitions					
MICO → CT	1,083	834.35	.24 ^{††}	2.06	1.85 – 2.30
MICO → CCT	411	351.18	.09 ^{††}	1.44	1.23 – 1.67
MICO → FN	3,044	3,352.48	.67 ^{**}	0.50	0.45 – 0.55
MIIN → CT	17	36.77	.09 ^{**}	0.41	0.25 – 0.67
MIIN → CCT	10	15.48	.05	0.62	0.33 – 1.18
MIIN → FN	173	147.75	.86 ^{††}	2.30	1.53 – 3.46
Other → CT	613	841.88	.13 ^{**}	0.51	0.46 – 0.57
Other → CCT	300	354.35	.07 ^{**}	0.72	0.62 – 0.84
Other → FN	3,666	3,382.77	.80 ^{††}	1.90	1.73 – 2.09
Client-to-therapist transitions					
CT → MICO	1,209	937.43	.68 ^{††}	2.20	1.97 – 2.45
CT → MIIN	26	39.61	.01 [*]	0.60	0.40 – 0.91
CT → Other	544	801.96	.31 ^{**}	0.47	0.42 – 0.52
CCT → MICO	499	396.26	.66 ^{††}	1.86	1.59 – 2.17
CCT → MIIN	11	16.74	.01	0.63	0.34 – 1.17

CCT → Other	242	339.00	.32**	0.55	0.47 – 0.65
FN → MICO	3,191	3,565.30	.47**	0.43	0.39 – 0.47
FN → MIIN	170	150.65	.03††	1.74	1.21 – 2.49
FN → Other	3,405	3,050.05	.50††	2.25	2.04 – 2.48
Client-to-Client transitions					
CT → CT	821	774.40	.66††	1.47	1.23 – 1.75
CT → CCT	208	268.15	.17**	0.50	0.41 – 0.62
CT → FN	221	207.45	.18	1.21	0.96 – 1.54
CCT → CT	199	262.68	.47**	0.46	0.37 – 0.57
CCT → CCT	152	90.96	.36††	2.57	2.03 – 3.25
CCT → FN	73	70.37	.17	1.06	0.80 – 1.40
FN → CT	294	276.93	.66	1.23	0.99 – 1.53
FN → CCT	95	95.89	.21	0.99	0.76 – 1.27
FN → FN	58	74.18	.13*	0.70	0.52 – 0.95

Note. CT = change talk; CCT = counter change talk; FN = client language unrelated to change; MICO = MI-consistent therapist behavior; MIIN = MI-inconsistent therapist behavior; Other = therapist behaviors comprised of closed questions, giving information, structure, filler, and facilitate.

†† More probable than expected by chance, $p < .01$. * Less probable than expected by chance, $p < .05$. ** Less probable than expected by chance, $p < .01$.

Table 4.

Secondary Transition Analysis

Initial event → subsequent event	Observed frequency	Expected frequency	Conditional probability	Odds ratio	Confidence limits
Therapist-to-client transitions					
MICO					
OQ → CT	484	285.35	.31 ^{††}	2.41	2.13 – 2.73
OQ → CCT	155	120.10	.10 ^{††}	1.41	1.17 – 1.70
OQ → FN	913	1146.55	.59 ^{**}	0.43	0.38 – 0.48
RPOS → CT	369	151.68	.45 ^{††}	4.30	3.71 – 5.00
RPOS → CCT	41	63.84	.05 ^{**}	0.60	0.43 – 0.83
RPOS → FN	415	609.48	.50 ^{**}	0.32	0.27 – 0.37
RNEG → CT	27	62.88	.08 ^{**}	0.37	0.25 – 0.55
RNEG → CCT	131	26.47	.38 ^{††}	8.82	6.99 – 11.14
RNEG → FN	184	252.66	.54 ^{**}	0.40	0.32 – 0.59
RBOTH → CT	13	11.58	.21	1.16	0.63 – 2.13
RBOTH → CCT	9	4.88	.14	2.00	0.98 – 4.07
RBOTH → FN	41	46.54	.65	0.66	0.39 – 1.11
ROther → CT	54	153.71	.06 ^{**}	0.28	0.21 – 0.38
ROther → CCT	16	64.69	.02 ^{**}	0.22	0.13 – 0.36
ROther → FN	766	617.60	.92 ^{††}	4.23	3.30 – 5.43
oMICO → CT	136	169.15	.15 ^{**}	0.75	0.62 – 0.91

oMICO → CCT	59	71.20	.06	0.80	0.61 – 1.05
oMICO → FN	725	679.66	.79 ^{††}	1.35	1.15 – 1.59
Other					
CQ → CT	316	405.22	.14 ^{**}	0.68	0.60 – 0.78
CQ → CCT	140	170.56	.06 ^{**}	0.76	0.63 – 0.92
CQ → FN	1748	1628.22	.79 ^{††}	1.48	1.32 – 1.66
oOther → CT	297	436.66	.13 ^{**}	0.56	0.49 – 0.64
oOther → CCT	160	183.79	.07 [*]	0.82	0.68 – 0.99
oOther → FN	1918	1754.55	.81 ^{††}	1.67	1.49 – 1.87
Client-to-therapist transitions					
CT					
CT → OQ	233	207.04	.13 [†]	1.18	1.01 – 1.38
CT → RPOS	635	179.11	.36 ^{††}	13.31	11.45 – 15.47
CT → RNEG	23	71.18	.01 ^{**}	0.27	0.18 – 0.41
CT → R BOTH	24	12.63	.01 ^{††}	2.43	1.47 – 4.03
CT → R Other	22	203.22	.01 ^{**}	0.08	0.05 – 0.12
CT → oMICO	272	264.26	.15	1.04	0.90 – 1.20
CT → CQ	225	267.13	.13 ^{**}	0.78	0.67 – 0.91
CT → oOther	319	534.83	.18 ^{**}	0.44	0.39 – 0.51
CCT					
CCT → OQ	62	87.52	.08 ^{**}	0.66	0.51 – 0.87

CCT → RPOS	35	75.71	.05**	0.41	0.29 – 0.59
CCT → RNEG	250	30.09	.33††	34.38	27.20 – 43.47
CCT → RBOTH	24	5.34	.03††	6.67	4.02 – 11.08
CCT → ROther	10	85.90	.01**	0.10	0.05 – 0.18
CCT → oMICO	118	111.70	.16	1.07	0.87 – 1.32
CCT → CQ	73	112.92	.10**	0.59	0.46 – 0.75
CCT → oOther	169	226.08	.22**	0.65	0.55 – 0.78
FN					
FN → OQ	787	787.44	.12	1.00	0.87 – 1.15
FN → RPOS	266	681.19	.04**	0.11	0.10 – 0.13
FN → RNEG	99	270.73	.01**	0.12	0.10 – 0.16
FN → RBOTH	18	48.03	.00**	0.14	0.08 – 0.24
FN → ROther	1,030	772.88	.15††	14.02	9.83 – 20.00
FN → oMICO	991	1,005.04	.15	0.94	0.83 – 1.07
FN → CQ	1,098	1,015.96	.16††	1.45	1.27 – 1.66
FN → oOther	2,307	2,034.09	.34††	2.17	1.94 – 2.42

Note. CT = change talk; CCT = counter change talk; FN = client language unrelated to change; MICO = MI-consistent therapist behavior; OQ = Open Question; RPOS = reflection of CT; RNEG = reflection of CCT; RBOTH = reflection of CT and CCT; ROther = neutral reflection; oMICO = other MICO behavior; CQ = closed question; oOther = therapist behaviors comprised of giving information, structure, filler, and facilitate.

† More probable than expected by chance, $p < .05$. †† More probable than expected by chance, $p < .01$. * Less probable than expected by chance, $p < .05$. ** Less probable than expected by chance, $p < .01$.

The following chapter presents the paper entitled “An examination of the MI causal model in an MI-pre-treatment for social anxiety disorder”. Chapter Six follows on from Chapter Five in exploring MI therapist and client behaviors in social anxiety disorder (SAD) but also expands upon the findings of Chapter Five by (1) Comparing TEE sessions to a supportive counseling control condition (SC) on MISC 2.5 behavior codes; (2) Examining the effect of relational components on client language, namely MI Spirit; and (3) Examining therapist and client behaviors as predictors of CBT treatment outcome

Chapter 6

An examination of the MI casual model in an MI pre-treatment for social anxiety disorder

This chapter has been prepared for submission to Psychotherapy.

Author contribution:

Ms. Mia Romano was solely responsible for the design of the research, analysis and write-up of this paper. Ms. Jelena Arambasic was responsible for coding motivational interviewing therapy recordings. Dr. Peters provided statistical and research supervision

An examination of the MI casual model in an MI pre-treatment for social anxiety disorder

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Abstract

Motivational interviewing (MI) was originally developed to treat problematic drinking but is increasingly used as an adjunctive treatment for anxiety disorders. A causal model has been proposed which may account for the efficacy of MI, whereby therapist MI-consistent behaviours (MICO) are related to client change talk (CT), and CT is linked to outcome. However, most research that examines the MI causal model has been conducted in the realm of substance use, therefore the current study aims to address this gap by investigating the MI causal model in an MI-style treatment for social anxiety disorder (SAD). Participants were 125 clients diagnosed with SAD randomized to receive either an MI-style treatment (Treatment Expectations and Engagement (TEE)) or supportive counselling (SC) before all receiving group cognitive behavioural therapy (CBT). Overall, the results supported some elements of the MI causal model in the context of SAD, but not all. First, the TEE condition was generally distinguishable from the SC condition in terms of therapist and client behaviors. Second, while therapist MICO did not predict change language, MI Spirit, valenced reflections, and closed questions did, with MI-inconsistent behaviors also predicting a greater frequency of counter-change talk. Lastly, therapist and client behaviors did not predict treatment outcome, however the effect of MICO on outcome was moderated by treatment condition. The findings support the first step of the MI causal model in the context of social anxiety, though indicate that the occurrence of these behaviors during MI pre-treatment may not extend to predict treatment outcome following adjunctive CBT.

Keywords: Change talk; therapist behaviors; motivational interviewing; causal model; social anxiety disorder

Motivational interviewing (MI) is a client-centered style of psychotherapy that aims to prepare people for change by helping them to explore and resolve ambivalence (Miller & Rollnick, 2002). While MI was originally developed to enhance substance use treatment, there is a growing body of evidence demonstrating the beneficial effects of adjunctive MI to improve client treatment uptake, engagement, and outcome in clients diagnosed with eating disorders, anxiety disorders, and comorbid mental health and substance use conditions (Arkowitz, Miller, & Rollnick, 2015; Arkowitz, Westra, Miller, & Rollnick, 2008). In the context of anxiety disorders for example, motivational enhancement strategies have shown utility in increasing rates of treatment entry and initiation (Barrera, Smith, & Norton, 2015; Buckner & Schmidt, 2009), and improving engagement with cognitive behavioral treatment (CBT), namely being linked to increases in homework compliance (Aviram & Westra, 2011; Westra, Arkowitz, & Dozois, 2009; Westra & Dozois, 2006) and decreased resistance (Aviram & Westra, 2011; Constantino, Westra, & Antony, 2015). Moreover, a three-session MI pre-treatment prior to CBT has been related to greater anxiety symptom reduction (Westra et al., 2009; Westra & Dozois, 2006) and, even in the presence of an active control condition participants diagnosed with generalized anxiety disorder (GAD) randomized to receive integrative MI-CBT demonstrated greater study retention and better long-term outcomes compared to CBT alone (Westra, Constantino, & Antony, 2016).

Though MI appears to be a promising adjunctive therapy for anxious clients, currently there is a lack of research that attempts to identify the aspects of MI treatment that contribute to positive client engagement and outcomes. Miller and Rollnick (2013) suggest that one way in which MI may contribute to client outcome is the selective elicitation and reinforcement of client language in favor of change, that is, change talk (CT). CT has been implicated in a causal chain model suggested to account for the observed benefits of MI (Miller & Rose, 2009). The model suggests that during MI, therapist directive use of MI-consistent (MICO) behaviors such as reflections, affirmations, and open questions facilitates client expression of

CT, and it this CT that is predictive of positive client outcome. The model also incorporates a second fundamental element of MI, the relational style or “MI Spirit” adopted by MI therapists. MI therapists aim to relinquish the expert role and create a collaborative partnership with the client, emphasizing the client’s autonomy and expertise in decisions about change, and evoke the clients’ own reasons, motivations, and commitment for change (Miller & Rollnick, 2013). Therapist MI spirit and empathic attunement are suggested to have a direct impact on client outcome as well as facilitating the expression of client language in favor of change (Moyers, 2014).

Research conducted predominantly in the field of addictive behaviors has supported elements of this causal chain. For example, therapist use of MICO behaviors, such as reflections and open questions have been linked to greater expression of CT in the areas of substance use (D’Amico et al., 2014; Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Gaume, Gmel, Faouzi, & Daeppen, 2008; Moyers, Martin, Houck, Christopher, & Tonigan, 2009), smoking (Catley et al., 2006) and health behaviors (Pirlott, Kisbu-Sakarya, Defrancesco, Elliot, & Mackinnon, 2012), and CT has been shown to predict better client outcome (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003; Barnett, Moyers et al., 2014; Bertholet, Faouzi, Gmel, Gaume, & Daeppen, 2010; Gaume et al., 2016; Hodgins, Ching, & McEwen, 2009; Moyers et al., 2009; Pirlott et al., 2012). There is also evidence to suggest that when therapists use behaviors that are incongruent with MI principles, such as confrontation and unsolicited advice giving, this has a detrimental effect on client outcome and expression of change language (Gaume et al., 2010; Gaume et al., 2008; Miller, Benefield, & Tonigan, 1993; Moyers et al., 2009). Furthermore, in a recent meta-analysis, the use of such MI-inconsistent behaviors (MIIN) was consistently linked to client counter-change talk (CCT), language that argues against behavior change, and CCT was predictive of worse client outcome in a variety of problem areas (Magill et al., 2014). In terms of the MI relational component, therapist empathy and empathic speech utterances have been shown to

positively relate to change language (both CT and CCT) (Borsari et al., 2014; Fischer & Moyers, 2014) and commitment CT (Engle, Macgowan, Wagner, & Amrhein, 2010). MI spirit has also been positively related to CT and CCT (Borsari et al., 2014) and meta-analytic research in the field of health behaviors has shown a positive effect of MI Spirit on both CT and outcome (Copeland, McNamara, Kelson, & Simpson, 2015).

While evidence for the causal chain from therapist behaviors to client CT to outcome is growing in the field of addictions and health behaviors research that investigates the model in populations diagnosed with other mental health concerns is limited. However, emerging research in the context of anxiety disorders has demonstrated the significance of therapist and client in-session behaviors in the prediction of client treatment outcome. For example, participants diagnosed with GAD who received MI demonstrated less resistance, and less resistance predicted greater worry reduction following CBT (Aviram & Westra, 2011; Constantino, Westra, & Antony, 2015). Client CCT during integrative MI-CBT has also been shown to predict client outcome, with MI shown to moderate the detrimental effect of CCT on outcome for participants with higher levels of early CCT (Button, Westra, Constantino, & Antony, 2015). Moreover, qualitative research has demonstrated the positive effect of MI relational style variables such as empathy and MI spirit on client experiences of CBT treatment for anxiety disorders (Kertes, Westra, Angus, & Marcus, 2011). These findings have further been supported by empirical studies demonstrating a positive relationship between therapist empathy and outcome (Constantino et al., 2015) and findings that clients whose therapists used an MI style during moments of resistance in CBT had lower levels of post-treatment worry and subsequent resistance (Aviram, Westra, Constantino, & Antony, 2016). In addition, research in the context of CBT alone has also pointed to the significance of client language during therapy in anxious populations. For example, Lombardi, Button, and Westra (2014) found that more CCT during CBT for GAD was associated with higher post-treatment worry scores and also differentiated treatment responders from non-responders.

Greater expression of CCT has also been associated with more therapist/client alliance ruptures (Hunter, Button, & Westra, 2014), and higher levels of resistance (opposition to the CBT therapy/therapist) early in treatment (Button, Westra, Hara, & Aviram, 2014).

Given emerging evidence that within-session behaviors are predictive of outcome in the context of adjunctive MI for anxiety disorders an examination of the causal chain model in this area seems relevant. Examining therapist and client behaviors during MI treatment for anxious clients may help guide clinician delivery of MI, emphasizing behaviors that contribute to the success of MI, and potentially improve client outcome. Furthermore, investigating whether the proposed causal chain translates across treatment domains can help to enhance the adjunctive use of MI in diverse problem areas, which may contribute to increased dissemination of MI services. Another point worth noting is since MI has generally been used as a stand-alone treatment with substance users, research that investigates the causal chain has done so with reference to outcome following the MI treatment alone. Whether the relationships between therapist and client behaviors during MI and outcome extend following the adjunctive treatment has not yet been investigated.

The current study aims to extend aforementioned research by examining the role of client language and therapist style and behaviors during an MI pre-treatment for social anxiety disorder (SAD) as compared to a supportive counseling pre-treatment designed not to incorporate MI factors. Given previous research examining therapist and client behaviors during MI, it is expected that therapist adoption of an MI-style and use of MICO will be positively related to client expression of change language (both CT and CCT), while MIIN behaviors are expected to predict less CT but more CCT. It is also hypothesized that MI Spirit, MICO and CT will predict better client outcome, while CCT and MIIN will predict worse client outcome. A full test of the causal chain using mediational models will be explored if results of preliminary analyses permit.

Method

Sample and Procedures

Participants were 125 adults (68 male; age: $M = 31.13$ ($SD = 1.46$)) with a primary diagnosis of SAD who presented for treatment at the Centre for Emotional Health Clinic, Macquarie University, Sydney during 2012- 2015.

Participants were drawn from an ongoing randomized controlled trial that examined the effect of MI pre-treatment prior to commencing a CBT group program.¹⁶ Participants contacted the Emotional Health Clinic during 2012-2015 through usual referral sources, including general practitioners, mental health professionals, occasional media coverage, and word of mouth. Telephone screening was conducted and those who emerged as potentially having anxiety-related difficulties were invited for a thorough assessment, which included the completion of an online questionnaire and a structured diagnostic interview (the Anxiety Disorders Interview Schedule – IV; ADIS-IV; Di Nardo, Brown, & Barlow, 1994) administered by graduate psychology students and clinical psychologists. All participants met inclusion criteria for the randomized controlled trial: they were over 18 years of age, had a primary diagnosis of SAD as measured by the ADIS-IV (Di Nardo et al., 1994), and a Clinician Severity Rating of symptoms of 4 or above on an 8-point scale (0 – *none* to 8 – *very severe*) (i.e., at least moderate impairment caused by SAD). Exclusion criteria were problems requiring immediate attention, such as clear suicidal intent, severe substance abuse or dependence, and active psychosis. Concurrent pharmacotherapy was allowed, provided that dosages had been consistent for 3 months and there were no plans to change during the course of treatment.

All participants provided informed consent and the procedures were approved by the Macquarie University Human Research Ethics Committee.

¹⁶ The sample for the current study represents 67% of the final sample analyzed for the randomized controlled trial.

Intervention. As part of the ongoing randomized controlled trial participants engaged in treatment conducted in two phases. Participants were randomly allocated to receive one of two preparatory interventions (Phase one), followed by CBT (Phase two).

Phase one. Phase one was either an MI-style intervention (called Treatment Expectation and Engagement (TEE)) designed to prepare participants for CBT or supportive counseling (SC). Phase two was the CBT intervention (details of CBT intervention are reported elsewhere; Rapee, Gaston, & Abbott, 2009).

Treatment expectation and engagement (TEE). Participants ($n = 85$) engaged in three one-hour sessions delivered individually by clinical psychologists or graduate clinical psychology students ($n = 15$). The sessions were designed as a preparatory treatment program to be conducted prior to CBT for SAD. The aim of the program was to address obstacles to full engagement with CBT for SAD, to enhance expectations about a positive outcome from CBT, and thereby, to enhance later outcomes from CBT. The TEE program extends some of the MI principles embodied in a program developed by Westra and Dozois (2008) to enhance engagement with treatment, but goes further to explicitly address expectations about CBT treatment for SAD. The TEE sessions involved discussion of: ambivalence and motivation; life values and the discrepancy between current behavior and those values; obstacles to change; expectations about treatment process and outcome; and, self-efficacy. The TEE program incorporated the MI principles of eliciting change talk, expressing empathy, developing discrepancy, rolling with resistance, and supporting self-efficacy described by Miller and Rollnick (2002). During the TEE sessions participants were invited to engage in treatment exercises that helped to elicit client costs and benefits of changing, identify values, and develop discrepancy. These elements were adapted from several sources including Forsyth and Eifert (2007) and Ciarrochi and Bailey (2008). Session One involved discussion of ambivalence and motivation and a cost-benefit analysis of remaining anxious vs. engaging in treatment; Session Two involved discussion of values and eliciting of values-behaviors

discrepancy; and, Session Three continued discussion of values-behavior discrepancy as well as detailed discussion of obstacles to and expectations for change, expectations of the treatment process, and boosting self-efficacy for change. All therapists carefully followed the manual-based protocol for the TEE sessions, with critical topics consistently introduced in the same order to all the clients. However in keeping with the client-centered spirit of MI, progression through session material was largely dependent on the client's engagement with the material.

Supporting counseling (SC). Participants ($n = 101$) engaged in three one-hour sessions delivered individually by clinical psychologists or graduate clinical psychology students ($n = 10$)¹⁷. The sessions were designed to control for the number of hours of therapist contact received by the TEE condition. Therapists provided clients with the rationale that the SC sessions were intended for therapists to get an understanding of the client's life story and background before entering the CBT program. Therapists employed supportive counseling skills such as reflective listening and open-ended questions to engage the client in the sessions, but were proscribed from discussing client concerns about anxiety or the treatment program and from eliciting or reinforcing change language. If the client began to discuss anxiety-related concerns and change topics the therapist responded in a supportive manner but aimed to redirect the conversation to life history.¹⁸

Phase two (CBT). After the three preparatory treatment sessions, participants engaged in group CBT for their social anxiety. CBT sessions were delivered and led by psychologists with expertise in these treatments. Groups made up of between 4 and 8 participants attended 3-hour treatment sessions delivered weekly over 12 weeks. Psychologists followed treatment protocols guided by manuals and participants received printed materials and handouts to support their learning. The efficacy of the CBT treatment protocol has been reported

¹⁷ The number of therapists represents those who conducted therapy with clients in the coded SC sample.

¹⁸ Treatment credibility was assessed using a scale developed by Borkovec and Nau (1972). TEE and SC were found to be equally credible: TEE: $M = 18.18$, $SD = 6.27$; SC: $M = 18.18$, $SD = 5.44$; $t(103) = .01$, $p = .994$.

previously (Rapee et al., 2009). The CBT program components included modification of explicit beliefs through evidence-gathering, hypothesis testing and examination of core beliefs, training in redeployment of controlled attentional resources away from threat and onto the task at hand, realistic appraisal and feedback of social performance, and in vivo exposure including elimination of safety behaviors and subtle avoidance.

Therapists. Therapists for Phase one and Phase two were final year post-graduate clinical psychology students and qualified clinical psychologists trained to deliver the TEE, SC, and CBT interventions. The CBT group was always lead by a qualified clinical psychologist, with a post-graduate psychology student to assist as co-therapist. Therapists had general training in clinical psychology and delivery of a range of psychological interventions, but did not have a specific allegiance to MI or CBT. Training consisted of viewing videotaped and live Phase one and Phase two therapy sessions, conducting initial sessions while being observed by a senior clinical psychologist who provided feedback, and weekly supervision by a senior clinical psychologist that was centered around adherence to the study protocol. The training procedures were designed to mimic those that might routinely occur in practice.

Materials

Severity of Symptoms

Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998). The SIAS is a 20-item scale that assesses the main fears and areas of avoidance in SAD. The SIAS has excellent psychometric properties (Peters, 2000). Participants completed the SIAS at the following time-points: prior to undertaking Phase one (baseline TEE or SC); following completion of Phase One; 1-month following completion of Phase 2 (1-month follow-up) and; 6-months following completion of Phase 2 (6-month follow-up). For the current study, only baseline and follow-up assessment of anxiety symptoms (conducted at both 1-month and 6-months following completion of the CBT group protocol) were utilized.

The Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995). The DASS is a 21-item measure that provides an assessment of general anxiety, stress, and depression. This measure correlates with the Beck Depression Inventory and Beck Anxiety inventory (Lovibond & Lovibond, 1995). Participant scores on the DASS were assessed to control for these general symptoms in statistical analyses if differences occurred between treatment conditions, therefore only baseline DASS scores were used in the current study.

Importance of change and Confidence to change. Participant motivation was assessed using the Importance/Confidence Form (ICF) originally developed by Miller & Rollnick (2002), and adapted for a socially anxious population by Buckner & Schmidt (2009). Items assessed both importance and confidence, for example, “On a scale of 0-10, rate how important it is for you to change your social anxiety-related behaviors” in which 0 = *not at all important* and 10 = *most important*, and, “On a scale of 0-10, rate how confident you are that you can change your social anxiety-related behaviors”, in which 0 = *not at all confident* and 10 = *most confident*. Two additional items were added for the current study to assess importance and confidence relating to attending treatment sessions for social anxiety. For example, “How important is it for you to attend treatment sessions for your social anxiety related behaviors”, again rated on a 10-point scale. Ratings of importance and confidence were scored separately to give a total rating for each, importance and confidence. Increases in Importance and Confidence have been shown to correspond with behavioral changes in a client with SAD (Buckner, Ledley, Heimberg, & Schmidt, 2008). Participant baseline importance and confidence was assessed to compare treatment conditions, and control for any differences in analyses if necessary.

MI Processes

Behavior Coding. Behavior coding was conducted using recordings of TEE and SC sessions. The sample of recordings was drawn from all available TEE ($n = 255$) and SC ($n =$

303) session recordings. Only one recording per participant was coded to avoid inflating the relationship between behaviors due to the fact that the same participant would be included more than once in the analysis. Thus, for each participant, one of the three TEE sessions was selected using a random number generator that allowed for an equal number of Session 1, 2, and 3 recordings. If a recording of the chosen session was not available (due to technical issues with the recording, for example), another session was chosen randomly. For six participants, no recordings were available to be included and therefore, these participants were excluded due to: inaudible or poor quality session recordings (4); recording missing (1); and client did not provide informed consent for recordings to be used in research (1). In order to compare differences between Phase one conditions a random sample of 40 SC sessions were also selected for coding. Again, only one session per each of the 40 SC participants was coded. There were no significant differences between coded and non-coded SC participants on demographic or clinical variables. The final sample available for analysis consisted of 79 TEE sessions (26 recordings for Session 1 and 3, and 27 recordings for Session 2) and 40 SC sessions (13 for Session 1 and 3, and 14 for Session 2). TEE sessions ranged in length from 23.36 to 89.21 minutes.¹⁹ SC sessions ranged in length from 33.16 to 62.13. Session length did not differ by treatment; TEE: $M = 52.44$, $SD = 9.49$; SC: $M = 51.70$, $SD = 6.49$, $t(117) = .45$, $p = .656$

Motivational Interviewing Skill Code 2.5 (MISC 2.5; Houck, Moyers, Miller, Glynn, & Hallgren, 2013). Client and therapist behaviors during TEE and SC sessions were coded using the MISC 2.5 from the Center on Alcoholism, Substance Abuse and Addictions (<http://casaa.unm.edu/download/misc25.pdf>). The MISC 2.5 is an observational rating system that combines elements of the MISC 2.1 and the Sequential Code for Observing Process Exchanges (MI-SCOPE; Martin, Moyers, Houck, Christopher, & Miller, 2005). The

¹⁹ There were four outlying TEE sessions that contributed to the wide range, two particularly short (23.36 and 24.44 minutes), and two particularly long (73.04 and 89.21 minutes). The discrepancy in length of sessions was due to two participants arriving late to the session (short sessions) and study administration occurring within the session (i.e., administering questionnaires rather than session content; long sessions).

MISC 2.5 draws together optimal elements of each system in order to capture specific therapist and client behaviors, including valenced therapist reflections, and also allows for sequential coding of MI sessions. It codes therapist and client language into mutually exclusive and exhaustive categories. Coding was performed in two passes. In the first pass, coders parsed the entire recording into utterances (thought units) and then completed a set of seven Likert rating scales to assess facets of therapist interpersonal skill (Acceptance, Empathy, Direction, Autonomy Support, Collaboration, and Evocation) and client self-exploration. In the second pass, a different coder applied behavioral codes to each therapist and client utterance. Coding was conducted using the Center on Alcoholism Substance Abuse and Addictions (CASAA) Application for Coding Treatment Interactions (CACTI; Glynn, Hallgren, Houck, & Moyers, 2012). This software allows for automated parsing of session recordings, which ensures that all coders code the same utterance, thus increasing reliability. The system also stores sequential data pertaining to each utterance.

Client language. Using the MISC 2.5, each client utterance was categorized as either change talk (CT), counter change talk (CCT), or unrelated to change (follow/neutral/ask; FN). In coding CT, coders are required to know the target behavior for change before coding each recording (for example, cutting down on drinking). However, target behaviors in anxiety treatment can vary greatly and may include a multitude of different areas for behavior change (Button et al., 2014; Lombardi et al., 2014). For example in the context of SAD, behavior change targets may include reductions in avoidance, use of safety behaviors and self-focused attention, and altering negative thinking styles to name a few. Furthermore the TEE sessions had an additional focus of improving client expectations about the CBT program. Thus, in using the MISC 2.5 in the context of the TEE sessions, multiple social-anxiety related target behaviors were allowed, as well as those statements pertaining to expectations about the treatment program, for example, “I know long term this is the only way that works”. Each client CT utterance was classified as either commitment (e.g., “maybe I should set a certain

time every day to just think over that day and write down anything that I've thought about, you know, negative thoughts that I've had"), taking steps (e.g., "... because I have difficulty public speaking, I joined the (toastmasters club)), reasons (e.g., "I just don't get to see them or do as many things with them because of the way I am"), desire (e.g., "I want to be the person that has a good time, rather than the person who is freaking out"), ability (e.g., "I honestly couldn't see myself failing to implement (the changes)"), need (e.g., "I know I can't keep going the way I am so I just have to do this"), or "other" statements that do not fall under the previous CT categories (e.g., "obviously the only way to overcome is exposure, gradual exposure, and that's why I was really keen to do the group program"). Components of CCT included statements counter to commitment (e.g., "I will probably retreat, I don't know maybe turn off my phone and all communications for a day..."), taking steps (e.g., "but while I'm there I'll avoid, like I'll restrict the time that I have one on one conversations with people"), reasons (e.g., "it's (change) going to be extremely uncomfortable and possibly painful emotionally"), desire (e.g., "I don't want to have to put myself in difficult situations"), need (e.g., "if there's some legitimate reason for me not to finish the (treatment program) then that's ok, I don't need to finish it"), ability (e.g., "I'm struggling with the confidence that I can do it, I'm really doubting that I can do it"), and "other" statements that do not fall under the previous categories (e.g., "I just don't know that I believe that it will actually get rid of, reduce the anxiety, the emotion, and the physical symptoms").

Therapist behavioral skill counts. Each therapist utterance was assigned one of 17 behavioral skill codes consistent with the MISC 2.5. Utterances were coded as open questions or closed questions, and simple or complex reflections. Reflections were further coded based on the valence of the reflection. That is, if the reflection directed the conversation towards change it received a positive valence (+), if the reflection steered the conversation away from change it received a negative valence (-), or a combination of both (+/-). If the reflection was unrelated to change it received a neutral valence (0). The remaining codes were: affirm,

support, reframe, emphasize control, advise with or without permission, raise concern with or without permission, confront, warn, direct, giving information, structure, filler, and facilitate.

Scoring of behavior codes. Six summary variables were created to encompass client and therapist codes. Client behaviors were summarized into: (a) CT, language towards change; (b) CCT, language away from change; and (c) FN, following and neutral utterances not related to changing anxiety behaviors. Therapist behaviors were summarized into behavior categories according to the MISC 2.5: (a) MICO behaviors (open questions, simple and complex reflections, affirm, support, reframe, emphasize control, advise with permission, and raise concern with permission); (b) MIIN behaviors (confront, warn, direct, advise without permission, and raise concern without permission); and (c) Other (closed questions, giving information, structure, filler, and facilitate)²⁰. Each summary variable represents the frequency of that behavior occurring during TEE or SC sessions. In the case of MICO, MIIN, and Other, the summary variable represents the total frequency of all behavior codes summarized into that category.

In order to examine effects of particular therapist behaviors on client language, therapist behaviors were split into sub-categories. Here, therapist reflections and questions were categorized separately from MICO and Other behaviors. The behaviors were summarized as such: (a) all reflections with a positive valence were collapsed into a positive reflection category (RPOS; reflections of CT); (b) all reflections of a negative valence were collapsed into a negative reflection category (RNEG; reflections of CCT); (c) combination reflections (+/-) were combined (RBOTH; reflections of both CT and CCT); (d) all neutral reflections were combined together (ROther); (e) open questions (OQ); (f) closed questions (CQ); (g) Other MICO (oMICO; comprised of affirm, support, advise with permission, raise concern with permission, reframe, and emphasize control).

²⁰ In the MISC 2.5, codes for Reframe and Closed Questions are not categorized, thus these codes were placed in summary variables that fit according to MI literature (Miller & Rollnick, 2013).

Global score ratings represent a single score for the entire TEE or SC session on each facet of interpersonal behavior, Acceptance, Empathy, Direction, Autonomy Support, Collaboration, Evocation, and client Self-Exploration. Ratings of Autonomy Support, Collaboration, and Evocation were averaged to create a global MI Spirit rating as per the MISC 2.5, thus for MI Spirit, scores represent an average value.

Coders and Reliability.

Coders were one postgraduate and one undergraduate psychology student who were kept blind to the pre-treatment severity and outcome status of the participants. Blinding to treatment condition was not possible given that it was clear from coding recordings whether the intervention was TEE or SC. Coders were trained in the use of the coding manual and software over a period of three months. Each coder was provided with about 50 hours of training, which focused on applying the MISC 2.5 and use of the CACTI system. Training consisted of (a) familiarization with MI literature; (b) detailed reading of the MISC 2.5, MITI, and CACTI manual; (c) coding and parsing pre-scored transcripts available from the Motivational Interviewing Network of Trainers (MINT) website (<http://www.motivationalinterviewing.org>); d) coding and parsing TEE and SC session recordings not used in the final sample until inter-rater reliability reached a criterion of .60 (indicating good agreement according to Cicchetti's (1994) criterion); and (e) weekly meetings to discuss any coding issues and disagreements and to prevent coder drift. During the coding of the present study, any disagreements in coding decisions were resolved by a supervisor (LP). In order to avoid bias in parsing, each coder parsed and coded half of the session recordings, so that those videos that one coder parsed, the other coded.

A random selection of 20% of TEE and SC session recordings ($n = 16$ and $n = 8$) were coded by both coders to assess inter-rater reliability. Cohen's kappa was used to assess

reliability at the utterance level (pooling all sessions). Kappa values of .70 or higher reflect excellent agreement, .41 to .69 reflect acceptable agreement, and .40 and below reflect unacceptable agreement (Cohen, 1960). Reliability of frequencies for each code individually was then estimated with the intraclass correlation coefficient (ICC; Shrout & Fleiss, 1979). Cicchetti's (1994) criterion identifies ICCs below .40 as showing poor agreement, .40 to .59 as fair agreement, .60 to .74 as good agreement, and .75 as excellent agreement.

Analysis Plan

Condition discrimination. Independent sample t-tests were conducted to compare treatment groups on MISC behavior codes for therapist and client behaviors. In order to control for increased probability of type 1 errors due to multiple tests, the level of significance was based on a Bonferroni adjusted critical value of $p = .003$ (.05/18).

Relationship between therapist behaviors and client language. Preliminary analyses to evaluate the pattern of associations between therapist and client behaviors during TEE sessions were conducted using bivariate correlations (Pearson r). To further examine the relationship between therapist behavior and client language in the TEE group, MICO, MIIN, and MI Spirit were regressed on client CT and CCT. To examine the effect of the MI relational style, the MI Spirit global rating was utilized as it represents a summary of three critical elements of MI relational style. FN was included as a covariate in regression analyses in order to control for client differences in verbosity (as per Vader, Walters, Prabhu, Houck, & Field, 2010). The effect of sub categories of MICO behavior on CT and CCT was also analyzed. In these analyses predictors were: open and closed questions, reflections of CT, reflections of CCT, reflections of both CT and CCT, and oMICO. MI Spirit and MIIN were also entered as predictors.

Predicting anxiety outcomes from therapist and client behavior. In order to account for the hierarchical structure of the data multilevel regression analyses were conducted in

SPSS version 21. Multilevel modeling (MLM) analyses control for any non-independence of data that might arise from being nested into treatment groups and employs maximum likelihood estimation to more accurately estimate standard errors (Hedeker, Gibbons, & Flay, 1994; Herzog et al., 2002). Another advantage of MLM is that it can account for unequal group sizes and accommodates missing data (Raudenbush & Bryk, 2002). A series of three-level regression models were evaluated to examine the relationship between therapist and client behaviors and anxiety severity outcome (1-month post treatment and 6-month follow-up). The data structure comprised three levels, with repeated measures (i.e., the baseline to 1-month post/6-month assessment points) at Level 1, nested within participants at Level 2, nested within group (i.e., each participant attended one of 24 CBT groups) at the third level. Accounting for nesting within groups also accounts for therapist effects as each therapist was assigned to one of the 24 groups. Model fit statistics (-2 Restricted Log Likelihood (-2LL)²¹) and ICC's were compared for the 2-level and 3-level models to determine the necessity of a third level. Fit statistics were also compared between models that included only a random intercept, and models that include both a random intercept and slope. All predictors and covariates were entered as fixed effects and grand-mean centered. Participant and group and the interaction between participant and group were treated as random effects. The models were estimated using restricted maximum likelihood estimation. Separate multilevel models were estimated for therapist behaviors and client behaviors.²²

Client behaviors. One model was estimated to assess predictors of change in anxiety severity from baseline to follow-up (1-month post-CBT and 6-months post CBT). The dependent variable was SIAS scores at three assessment points (baseline, post CBT, and 6-months post CBT). Client CT, CCT, and condition (SC = 0 or TEE = 1) were entered at the

²¹ As only random components of the models were being compared, -2 Restricted Log Likelihood was utilized.

²² The Optimal Design computer program was utilized to calculate power for multilevel model analyses in the current study (Raudenbush et al., 2011). Given that the number of treatment groups in the study was fixed, the MDES approach was used. This approach computes the minimum effect size that can be detected at a particular level of power for a pre-specified sample size. With power set at .80, and the predicted intra-class correlation at the group level set at 0.10, a moderate effect size could be achieved with 24 groups.

second level, while accounting for FN and medication status. Interaction terms between CT/CCT by time, and CT/CCT by condition were also entered.

Therapist behaviors. Analyses predicting anxiety severity from therapist behaviors mirrored those described above, except in terms of predictor variables. In this case, MICO, MIIN, and therapist MI spirit were entered alongside condition, while accounting for medication status. Interaction terms between each therapist behavior category by time, and by condition were also entered.

Results

Sample Characteristics

Baseline demographic characteristics and anxiety severity for the final coded sample were analyzed using independent samples t-tests for continuous variables and chi-square for nominal/categorical variables (Table 1). Treatment conditions (SC vs. TEE) did not differ on baseline anxiety, importance and confidence ratings, or demographic characteristics, except that more participants in the TEE group were currently taking medication for their anxiety. Comparisons between participants who were medicated and those who were not on predictor and outcome variables showed that medicated participants had significantly higher SIAS scores at baseline ($M = 59.86$, $SD = 10.33$ vs. $M = 55.18$, $SD = 10.81$; $t(117) = -2.20$, $p = .030$). Thus, medication status was used as a covariate in analyses predicting SIAS scores.

<Insert Table 1>

Reliability Estimates

Reliability of utterance-to-utterance agreement among coders. For the TEE sessions, Cohen's kappa for the overall MISC codes was .91, with the majority of kappa values falling in the good to excellent range ($\kappa = .55$ to 1.00). Two behavior codes achieved a

low level of agreement, one being confront ($\kappa = .33$) and one CCT language category (negative taking steps: $\kappa = .00$). Lower reliability on MIIN codes is consistent with past research and may be attributed to the low number of MIIN behaviors occurring in the dataset. Similarly, there were only three negative taking steps utterances, thus, a disagreement on this code is not unusual. For SC sessions, Cohen's kappa for the overall MISC codes was .84, with the majority of kappa values falling in the good to excellent range ($\kappa = .51$ to 1.00). There were seven behavior codes that achieved a low level of agreement (reframe $\kappa = .33$, emphasize control $\kappa = .18$, and confront, direct, filler, positive simple reflection, positive reason CT: $\kappa = .00$). Again, the very low frequency of these codes may explain the disagreement (reframe occurred five times, positive reason CT occurred twice, and the remaining five codes occurred once). Kappa values for each behavior code are presented in the Appendix.

Reliability of frequencies for behavior categories. ICCs for recoding MISC behaviors into six and nine categories were all in the acceptable range for TEE and SC sessions (ICC's ranged from .533 to .999).

Reliability of global ratings. ICCs for global ratings were also in an acceptable range for both TEE and SC sessions (ICC's ranged from .533 to .976). ICC reliability for Direction in the SC sessions was lower, though still acceptable: .432. ICC's for all behavior categories and global ratings are presented in the Appendix.

Condition Discrimination

Independent samples t-tests were used to examine differences between TEE and SC on MISC behavior categories. Results are presented in Table 2. As expected, the frequency of client CT and CCT was greater in the TEE condition than in the SC condition, while clients

uttered more FN statements in the SC condition than in the TEE condition. In terms of therapist behaviors, MICO behaviors did not differ between conditions, though MIIN behaviors were more prevalent in the TEE sessions than in the SC sessions. Global ratings of MI spirit and Direction were higher in the TEE condition than in the SC condition, though ratings of Acceptance and Empathy did not differ significantly between conditions.

Therapist MI proficiency. Therapist MI proficiency was evaluated by comparing MISC behavior codes against the Motivational Interviewing Treatment Integrity (MITI 3.1.1; Moyers, Martin, Manuel, Miller, & Ernst, 2010) recommended proficiency and competency standards for clinicians. TEE therapists met competency standards for percent complex reflections ($M = 58\%$, $SD = 12.95$) and therapist global factors (descriptive statistics are presented in Table 2). Beginning proficiency was not achieved for percent open questions ($M = 44\%$, $SD = 12.71$), percent MI adherent behaviors ($M = 84\%$, $SD = 12.26$), or the ratio of reflections-to-questions ($M = .75$, $SD = .41$), however sample averages were close to the recommended standards.²³

<Insert Table 2>

Relationship between therapist language and client language during TEE sessions

Bivariate correlations. Examining bivariate correlations showed that neither MICO nor MIIN were related to CT ($p = .281$, $p = .509$) or CCT ($p = .168$, $p = .761$). Of the specific therapist behaviors, only positive reflections were related to CT ($r = .55$, $p = .001$), while positive reflections, negative reflections, and reflections of both CT and CCT were related to CCT ($r = .35$, $p = .001$, $r = .63$, $p < .001$, and $r = .24$, $p = .036$, respectively). The global ratings of Empathy, Direction, and MI Spirit were all positively correlated with CT ($r = .26$, p

²³ MITI beginning proficiency standards (values are enclosed in parentheses): Percent MI Adherent (90%); percent open question (50%); percent complex reflection (40%); reflection-to-question ratio (1); global ratings (average of 3.5). MITI competency standards (values are enclosed in parentheses): Percent MI Adherent (100%); percent open question (70%); percent complex reflection (50%); reflection-to-question ratio (2); global ratings (average of 4).

= .022, $r = .35$, $p = .002$, $r = .35$, $p = .001$, respectively) and CCT ($r = .28$, $p = .012$, $r = .25$, $p = .027$, $r = .31$, $p = .005$).

Regression analyses. Results for regression analyses predicting CT and CCT, controlling for FN are presented in Table 3 and 4. MI Spirit²⁴ emerged as the only significant predictor of CT, though both MI Spirit and MIIN behaviors predicted the frequency of CCT. Two further regression analyses were conducted to examine the relationship between specific therapist behaviors and client CT/CCT. Closed questions and positive reflections significantly predicted CT, and MI Spirit approached significance. Closed questions, negative reflections, MIIN, and MI Spirit were significant predictors of CCT.

<Insert Table 3>

<Insert Table 4>

Predicting Anxiety Outcomes from Therapist and Client Behavior

Although group effects were included because clients were nested within treatment groups, inclusion of a third level to account for group effects did not explain a significant proportion of the variance. The ICC was .011, suggesting that 1.1% of the total variance in SIAS scores was accounted for by differences between treatment groups, thus not necessitating a three-level model. Second, to determine whether inclusion of a random slope was necessary, an unconditional growth model that included a random slope at the subject level was compared to the intercept only model. The ICC for the random slope was .23 and inclusion of a random slope resulted in better model fit ($-2RLL = 2529.677$ vs. 2678.435 , χ^2

²⁴ The MI Spirit variable was negatively skewed and this was corrected by a square root transformation. Separate analyses were run using the transformed MI Spirit variable and the results did not differ, thus for ease of interpretation results from analyses using the untransformed MI Spirit variable are presented.

(2) = 148.76, $p < .001$. Therefore, a random slope was added to multilevel models of therapist and client predicting SIAS scores²⁵.

Predicting client anxiety outcomes from client behavior. Table 5 shows the results of the two level linear mixed model examining the relationship between client language (CT and CCT) and anxiety outcomes. Results revealed that SIAS scores significantly decreased over time, $t(116.63) = -11.78$, $p < .001$. Client language did not significantly predict client level of social anxiety or the linear slope of anxiety change. Treatment condition (TEE vs. SC), medication status, and the interaction terms between client language and treatment condition were also non-significant.

Predicting client anxiety outcomes from therapist behavior. Table 6 shows the results of the two-level linear mixed model examining the relationship between therapist behaviors (MICO, MIIN, and MI Spirit) and anxiety outcomes. Therapist behaviors and MI Spirit did not significantly predict SIAS anxiety levels or the linear slope of anxiety change. However, there was a significant interaction between MICO behaviors and treatment condition (TEE vs. SC), $t(105.24) = 2.03$, $p = .045$. MICO (main effect), MIIN, MI Spirit, treatment condition, and medication were non-significant predictors. In examining a pictorial depiction of the interaction between MICO and condition (Figure 1), it appeared as though higher frequencies of MICO corresponded with better anxiety outcomes for the TEE group, but worse anxiety outcomes for the SC group. The plot also appeared to demonstrate that lower frequencies of MICO corresponded with worse anxiety outcomes for the TEE group, but better outcome for the SC group.

Overall, these results suggest that client and therapist behaviors alone do not predict CBT treatment outcome, though treatment condition (TEE vs. SC) may moderate an effect of

²⁵ For all analyses predicting SIAS outcome, the intercept only model was compared to the model that included a random slope and for all analyses the slope model significantly improved model fit, therefore results have been presented for two level mixed models that included a random intercept and random slope.

MICO behaviors on anxiety outcomes, where greater frequencies of MICO behaviors in the TEE group showed a positive effect on SIAS scores following CBT²⁶.

Given that client CT and CCT, and therapist MI Spirit, MICO, and MIIN did not significantly predict SIAS scores post CBT, a full test of the MI causal chain via mediation analyses was not conducted.

<Insert Table 5>

<Insert Table 6>

<Insert Figure 1>

Discussion

The primary aim of the current study was to examine elements of the MI causal chain in the context of an MI-style pre-treatment for SAD. Specifically, the study examined differences between TEE and SC on MI process variables, the relationship between therapist behaviors and relational style and client language during the TEE condition, and the effect of therapist and client behaviors on anxiety treatment outcome. While some results supported study hypotheses, the overall results did not call for a full test of the MI causal model via mediation analyses.

In order to first establish that the TEE condition possessed elements unique to MI, both TEE and SC sessions were compared on MI behavior counts and global ratings according to the MISC 2.5. As expected, TEE clients uttered more CT and CCT language, while SC clients showed higher frequencies of neutral language. In terms of therapist

²⁶ In order to ensure that analyses were not affected by missing data due to participant dropout, the pattern-mixture approach detailed by Atkins (2005) was followed. A dummy variable for participant drop-out was added to each multi-level model as a predictor, along with the interaction term between drop-out and predictors. The drop-out variable was not significant in either therapist or client predictor models suggesting that results (i.e., the fixed effects estimates from the multi-level models) did not depend on missing data due to drop-out. *N.B.* Clients who attended less than eight CBT sessions (of 12) were counted as drop-outs.

behaviors, MICO behaviors were similar in both TEE and SC groups, as were global ratings of therapist empathy and acceptance. Given that the SC condition required therapists to use counseling micro skills such as open questions and reflections in order to facilitate discussion of the client's life history, similar frequencies of MICO behaviors is to be expected, as is the general therapeutic style of acceptance and empathic attunement. Differences emerged in global ratings of MI Spirit and Direction, both elements that are thought to be more unique to MI, demonstrating that TEE therapists were likely more directive, evocative and collaborative in terms of helping the client discuss change. Also, the TEE condition had higher frequencies of reflections of CT and CCT corroborating a focus on change language. There were significantly more MIIN behaviors in the TEE condition than in the SC condition, which might also be attributed to the more directive nature of the TEE sessions. Though MIIN behaviors are proscribed in MI, some of the behavior indices can also fall into the MICO category depending on therapist delivery. For example, giving advice with or without permission (either MICO or MIIN, respectively). Thus, it is possible that some TEE therapists used directive elements of MI in an MI-incongruent fashion, thus increasing the frequency of MIIN behaviors. Given that SC was designed so that therapists had very little input other than encouraging participants to speak about their life history, there was little opportunity to give advice or offer direction, let alone in a MIIN fashion. Overall though there were very few MIIN behavior counts in the TEE sessions, and especially relative to MICO behaviors (on average there were 17 times more MICO behaviors than MIIN behaviors), suggesting that for the most part TEE therapists behaved in an MI-consistent manner.

In examining the relationship between therapist behaviors and client language, neither MICO nor MIIN behaviors were correlated with CT or CCT, though MIIN behaviors did predict a greater frequency of CCT in regression analyses. Regression analyses further corroborated the bivariate correlations between MI Spirit and CT and CCT, and also pointed to specific therapist behaviors that may be unhelpful in eliciting change language (closed

questions) or may increase the likelihood of change language (valenced reflections). Past research in substance using populations has generally found a positive effect of MICO on CT and CCT (Apodaca et al., 2016; Borsari et al., 2014; Gaume et al., 2010; Moyers et al., 2009), while MIIN has been shown to relate to more CCT (Gaume et al., 2010; Moyers et al., 2009) and either less CT (D'Amico et al., 2014; Gaume et al., 2010) or show no relationship with CT (Moyers et al., 2009). For socially anxious clients, MIIN behaviors predicted a greater frequency of CCT, and were unrelated to CT, which might suggest that even low frequencies of MIIN link to more resistance to change. While the current study did not support the role of the larger category of MICO behavior in engendering change talk, it highlighted the relationship between reflections and change language, and particularly demonstrated that the valence of the reflection is important as demonstrated by D'Amico et al. (2014), Barnett, Spruijt-Metz et al. (2014), Moyers et al. (2009, 2011). That is, reflections of CT predicted increases in CT, while reflections of CCT talk predicted increases in CCT. Since one of the main goals of MI is to help clients talk themselves into change (Miller & Rollnick, 2002), this finding may suggest that TEE therapists could benefit from further training in how to reframe client CCT into positive change language. Barnett, Spruijt-Metz, et al. (2014) demonstrated that when a client offered CCT and the therapist responded with a positive reflection, this increased the likelihood of positive change language from the client. Interestingly, in the current study, reflections of CT and double-sided reflections (reflections of both CT and CCT) were significantly positively correlated with CCT, so this may indicate that therapists were attempting to positively reframe client language, however given the correlational research design, it is difficult to draw definite conclusions.

In comparing open and closed questions, open questions did not predict CT or CCT though closed questions were found to negatively predict both CT and CCT. While closed questions are not an MI-incongruent behavior specifically, they might have a particularly negative effect in the context of social anxiety because closed questions allow the socially

anxious individual to respond with a short answer and avoid elaborating or offering change language. However, this interpretation would suggest that open questions might have a positive effect on client change language utterances, and in the current study they did not. This might be explained by the content of the open question and analysis technique. In general, research has been inconsistent in demonstrating a relationship between open questions and change language (see Romano & Peters, 2014), however valenced questions (questions about positive or negative aspects of the target behavior) have been shown to relate to change language (Moyers et al., 2009). Also, studies that have conducted transition analyses between open questions and change language have shown that open questions were significantly more likely to transition to change language (Apodaca et al., 2016; D'Amico et al., 2014; Romano & Peters, Study Four, Chapter Five). Perhaps the majority of open questions in TEE sessions were not specifically directed at asking about change, which may explain why the overall frequency of open questions did not predict change language. The content of open questions could be an important factor to investigate in future research in terms of whether an open question predicts more client change language or not.

The findings that MI spirit emerged as a predictor of both CT and CCT support the role of the MI relational style as having an impact on client behavior (Moyers, 2014; Miller & Moyers, 2015), and coincide with research investigating the association between relational factors and change language. For example, global ratings of therapist empathy and empathic speech utterances have been related to increases in change language (both CT and CCT) (Borsari et al., 2014; Fischer & Moyers, 2014), as has MI Spirit (Borsari et al., 2014). In the context of generalized anxiety, clients whose CBT therapists responded to moments of client resistance with MI spirit and empathy, showed less resistance the following treatment session, demonstrating an impact of the specific relational style. However, it should be noted that the effect of MI Spirit on CT only approached significance when specific therapist behaviors were included in the model, which may suggest that MI Spirit is more relevant in the

elicitation of CCT, at least within the current sample. Nevertheless, the findings highlight the importance of therapist relational style compared to the general category of MICO behaviors and perhaps demonstrate that MI Spirit might be particularly important for clients who are socially anxious. Given that socially anxious individuals often feel uncomfortable in the presence of others, and especially in a space that requires a level of open communication, being offered support and a feeling of collaboration may provide a sense of comfort to explore the change process openly. Thus, the relational style may be more likely to draw out the client's change language as opposed to an accumulation of MI-consistent behaviors.

While the aforementioned results provide some support for the MI causal chain in terms of the relationship between therapist behaviors and client language, the current study did not support therapist and client behaviors as predictors of anxiety treatment outcome. These results may be due to the study design and population. That is, in past research with anxious populations that has shown an effect of client language on outcome the language has been rated either during CBT (e.g., Lombardi et al., 2014) or in integrative MI-CBT where both MI and CBT sessions had been coded (Button et al., 2015). The current study used MI as a pre-treatment and did not maintain MI throughout the CBT sessions therefore client change language was rated at the very outset of treatment. While Button et al. (2015) also measured CCT at the outset of treatment, perhaps because the current study did not integrate MI techniques throughout CBT, clients were not reminded of their initial reasons to change or maintain their behavior and thus earlier language did not influence their actions within the group program and during the follow-up period. It is possible that pre-treatment client change language is more likely to relate to in-session CBT behaviors, like homework compliance and treatment attendance for example. Thus, examining more proximal outcome measures might provide an avenue for future research.

A related point is to examine different types of change language, for example, CCT that reflects maintenance of the status quo or CCT that reflects opposition to the therapist or

treatment itself (resistance). Sijercic, Button, Westra, and Hara (2016), found that higher CCT in the presence of resistance was related to poorer outcomes for clients with GAD, and that when examined together only opposition CCT predicted proximal and distal outcomes. Thus, for the current sample it may be the case that other factors, for example the context of the change language utterance, could impact the relationship between change language and outcome. It might also be important in the context of SAD to examine the role of self-generated versus other-generated client language. In a recent study examining change language and brain activation, researchers found that self-generated CT and CCT elicited greater brain activation compared to experimenter-generated language, pointing to the importance of the origin of change language (Feldstein Ewing, Yezhuvath, Houck, & Filbey, 2014). In the context of MI for social anxiety, there might be more cases of other-generated change language, which may affect the relationship between language and social anxiety symptoms. For example, if the client is severely anxious it is likely that the TEE therapist will attempt to engage the client by offering examples of pros and cons of changing. Socially anxious clients might not feel comfortable to share their own reasons to change due to fear of judgment and instead may agree to therapist-derived ideas about change. Therefore, such change language may not have an enduring effect or capacity to shift the client into action, as is the aim of eliciting change language.

In relation to therapist variables, given the length of the CBT program, there is ample opportunity for new behaviors and experiences in the group that may have a larger impact on client anxiety following treatment. It is possible that therapist behaviors experienced by clients in TEE are linked to their engagement and experience of CBT, however this was not assessed in the current study. Interestingly though, treatment condition (TEE vs. SC) was found to moderate the effect of MICO on anxiety change, where a greater frequency of MICO behaviors in the TEE group was associated with better treatment outcome, while fewer MICO behaviors were associated with worse treatment outcome. On the other hand for the SC group,

fewer MICO behaviors were linked to better treatment outcome, and more MICO behaviors were linked to worse treatment outcome. Perhaps this finding is attributed to the type of MICO behaviors that were frequent in each condition. There were no differences between groups on the broader MICO category or open questions. However TEE groups showed a greater frequency of reflections of change language and also other MICO behaviors, which included offering advice (with permission), emphasizing control, affirm, and support. Therefore, it may be that some therapist's skills, perhaps those that more directly facilitate the client's change process, have a positive influence on outcome. For example, during CBT the client might recall advice and strategies offered during TEE that may influence their ability to engage and benefit from CBT material. Also, emphasize control and affirm are elements that aim to enhance self-efficacy and autonomy for change that may impact how the client deals with difficult tasks following the pre-treatment. In examining frequencies of specific therapist behaviors, the average frequency of advise with permission, affirm, and emphasize control was greater in the TEE condition, which might support this idea. Given the relatively low frequency of individual behavior codes the current study could not examine the influence of specific behaviors on outcome, however this may be an avenue for future research.

While the type of behavior exhibited in the TEE and SC sessions may explain the effect of higher numbers of MICO behaviors for TEE participants it does not necessarily explain why fewer MICO behaviors were associated with either worse outcome for the MI group or better outcome for the SC group. This may be a case of doing the right thing at the right time. Given that the purpose of the SC group was for the clients to discuss their life history in a non-directive manner, perhaps clients whose therapists remained relatively quiet (as opposed to frequently asking questions or offering reflections) had better outcome because they had a greater opportunity for self-guided self-exploration, and the SC sessions functioned as practice in exposure, which better prepared them for the CBT group. Because the TEE

sessions had a specific aim and structure that focused on change it may be damaging if therapists do not frequently use behaviors that are consistent with this process.

While the results support some elements of the MI causal model, particularly the relationship between MI Spirit and change language, and specific therapist behaviors and change language, they should be interpreted in light of study limitations. Given that the main aim of the study was to examine the TEE condition, only 40 SC sessions were chosen for analyses. Though coded and non-coded SC clients did not differ on demographic or clinical variables, results may have differed if more SC sessions were included in analyses, however an advantage of MLM is the ability to handle unbalanced designs (Raudenbush & Bryk, 2002). A second limitation relates to variable frequency and distribution. MIIN behaviors were very infrequent in the current study, which impacts the ability to make definitive conclusions regarding this variable. Furthermore, while coders achieved adequate reliability, only two passes of each session were performed (as opposed to three suggested for new coders), thus the findings would need to be replicated in a study using expert coders. A related point is that TEE therapists did not meet MI proficiency for all MITI standards, which may call the fidelity of the MI into question. However, the training provided in the larger randomized controlled trial was designed to mimic MI training that might be used in general clinical practice, and while the TEE program was based in part on MI principles it had an additional focus of examining treatment expectations specifically. Replication using different measures of anxiety would also be worthwhile, given that the SIAS was the only measure assessed from baseline to follow-up and may not capture all the intricacies of an SAD diagnosis, including clinician ratings. Finally, the study was essentially correlational in nature and though the results offer insight into how therapist and client variables interact we cannot assume one variable causes another, and experimental research is needed to establish causality.

Corresponding with an experimental design future research could investigate change language and therapist behaviors during the CBT component of SAD treatment. Perhaps language in the context of the active treatment component is more relevant to predicting client treatment outcome in this context. Because clients actively tackle the change process during CBT, perhaps this is where they become more fully aware of their own reasons to change or not change. Change language and therapist behaviors during TEE sessions might also predict proximal outcome measures, for example measures of treatment engagement including homework compliance, treatment attendance and dropout, ambivalence and resistance. Furthermore, therapist behaviors and style during TEE sessions could affect client and therapist alliance during CBT as has been alluded to in qualitative research (Kertes et al., 2011).

While the current study possesses some limitations it is the first to examine elements of the MI causal chain in the context of SAD in a relatively large treatment-seeking sample and in the presence of a control condition. In this way differences between groups could be examined and variables assessed for uniqueness to MI-style treatment. The findings also highlight the importance of MI Spirit and valenced reflections in predicting change language during MI therapy for SAD. Moreover, the study suggests that a positive effect of MICO behaviors may be dependent on the type of treatment in which these behaviors occur.

References

- Amrhein, P. C., Miller, W. R., Yahne, C. E., Palmer, M., & Fulcher, L. (2003). Client commitment language during motivational interviewing predicts drug use outcomes. *Journal of Consulting and Clinical Psychology, 71*, 862–878. doi:10.1037/0022-006X.71.5.862
- Apodaca, T. R., Jackson, K. M., Borsari, B., Magill, M., Longabaugh, R., Mastroleo, N. R., & Barnett, N. P. (2016). Which individual therapist behaviors elicit client change talk and sustain talk in motivational interviewing. *Journal of Substance Abuse Treatment, 61*, 60 – 65. doi: 10.1016/j.jsat.2015.09.001
- Arkowitz, H., Miller, W. R., & Rollnick, S. (Eds.). (2015). *Motivational interviewing in the treatment of psychological problems*. (2nd ed.). New York: Guilford Press.
- Arkowitz, H., Westra, H. A., Miller, W. R., & Rollnick, S. (Eds.). (2008). *Motivational interviewing in treating psychological problems*. New York: Guilford Press.
- Atkins, D. C. (2005). Using multilevel models to analyze couple and family treatment data: Basic and advanced issues. *Journal of Family Psychology, 19*, 98-110. doi 10.1037/0893-3200.19.1.98
- Aviram, A., & Westra, H. A. (2011). The impact of motivational interviewing on resistance in cognitive behavioral therapy for generalized anxiety disorder. *Psychotherapy Research, 21*, 698–708. doi: 10.1080/10503307.2011.610832
- Aviram, A., Westra, H. A., Constantino, M. J., & Antony, M. M. (2016). Responsive management of early resistance in cognitive-behavioral therapy for generalized anxiety disorder. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000100
- Barrera, T. L., Smith, A. H., & Norton, P. J. (2015). Motivational interviewing as an adjunct to cognitive behavioral therapy for anxiety. *Journal of Clinical Psychology, 0*, 1-10. doi: 10.1002/jclp.22239

- Buckner, J. D., & Schmidt, N. B. (2009). A randomized pilot study of motivation enhancement therapy to increase utilization of cognitive-behavioral therapy for social anxiety. *Behavior Research and Therapy*, 47, 710–715. doi:10.1016/j.brat.2009.04.009.
- Button, M. L., Westra, H. A., Constantino, M. J., & Antony, M. M. (2015). *Client motivation as a moderator of treatment outcomes in MI-CBT for generalized anxiety*. In H. A. Westra and M. J. Constantino (Moderators), An allegiance controlled RCT of MI-CBT for generalized anxiety. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.
- Barnett, E., Moyers, T. B., Sussman, S., Smith, C., Rohrbach, L. A., Sun, P., Spruijt-Metz, D. (2014). From counselor skill to decreased marijuana use: Does change talk matter? *Journal of Substance Abuse Treatment*, 46, 498–505. doi: 10.1016/j.jsat.2013.11.004
- Barnett, E., Spruijt-Metz, D., Moyers, T. B., Smith, C., Rohrbach, L. A., Sun, P., Sussman, S. (2014). Bidirectional relationships between client and counselor speech: The importance of reframing. *Psychology of Addictive Behaviors*. Advance online publication. doi: 10.1037/a0036227
- Bertholet, N., Faouzi, M., Gmel, G., Gaume, J., & Daeppen, J. B. (2010). Change talk sequence during brief motivational intervention, towards or away from drinking. *Addiction*, 105, 2106–2112. doi:10.1111/j.1360-0443.2010.03081.x
- Borkovec, T., & Nau, S. (1972). Credibility of analogue therapy rationales. *Journal of Behavior Therapy and Experimental Psychiatry*, 3, 257-260. doi: 10.1016/0005-7916(72)90045-6
- Borsari, B., Apodaca, T. R., Jackson, K. M., Mastroleo, N. R., Magill, M., Barnett, N. P., & Carey, K. B. (2014). In-session processes of brief motivational interventions in two trials with mandated college students. *Journal of Consulting and Clinical Psychology*, Advance Online Publication. doi: 10.1037/a0037635

- Buckner, J. D., Ledley, D. R., Heimberg, R. G., & Schmidt, N. B. (2008). Treating comorbid social anxiety and alcohol use disorders: combining motivation enhancement therapy with cognitive-behavioral therapy. *Clinical Case Studies*, 7, 208–223. doi:10.1177/1534650107306877
- Button, M. L., Westra, H. A., Hara, K. M., & Aviram, A. (2014). Disentangling the impact of resistance and ambivalence on therapy outcomes in cognitive behavioral therapy for generalized anxiety disorder. *Cognitive Behavior Therapy*. Published online. doi:10.1080/16506073.2014.959038
- Catley, D., Harris, K. J., Mayo, M. S., Hall, S., Okuyemi, K. S., Boardman, T., & Ahluwalia, J. S. (2006). Adherence to principles of motivational interviewing and client within-session behavior. *Behavioral and Cognitive Psychotherapy*, 34, 43–56. doi:10.1017/S1352465805002432
- Ciarrochi, J. V., & Bailey, A. (2008). *A CBT Practitioner's Guide to ACT: How to Bridge the Gap Between Cognitive Behavioral Therapy and Acceptance and Commitment Therapy*. Oakland, CA: New Harbinger Publications.
- Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, 6, 284–290. doi:10.1037/1040-3590.6.4.284
- Cohen, J. A. (1960). Coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20, 37–46. doi:10.1177/001316446002000104
- Constantino, M. J., Westra, H. A., & Antony M. M (2015). *Mediators of treatment effects in a randomized controlled trial testing the efficacy of augmenting CBT with motivational interviewing for severe generalized anxiety disorder*. In H. A. Westra and M. J. Constantino (Moderators), An allegiance controlled RCT of MI-CBT for generalized anxiety. Symposium

presented at the 46th Annual Meeting of the Society for Psychotherapy Research,
Philadelphia, USA.

Copeland, L., McNamara, R., Kelson, M., & Simpson, S. (2015). Mechanisms of change within
motivational interviewing in relation to health behaviors outcomes: A systematic review.

Patient Education and Counseling, 98, 401-411. doi:10.1016/j.pec.2014.11.022

D'Amico, E.J., Houck, J.M., Hunter, S.B., Miles, J.N.V., Osilla, K.C., Ewing, B.A. (2014). Group
motivational interviewing for adolescents: Change talk and alcohol and drug outcomes.

Journal of Consulting and Clinical Psychology, 83, 68–80. Advance online

publication. <http://dx.doi.org/10.1037/a0038155>

Di Nardo, P., Brown, T., & Barlow, D. (1994). *Anxiety Disorders Interview Schedule for DSM-IV -
Lifetime version*. Albany, NY: Graywind Publications.

Engle, B., Macgowan, M. J., Wagner, E. F., & Amrhein, P. C. (2010). Markers of marijuana use
outcomes within adolescent substance abuse group treatment. *Research on Social Work*

Practice, 20, 271- 282. doi: 10.1177/1049731509347855

Feldstein Ewing, S. W., Yezhuvath, U., Houck, J. M., Filbey, F. M. (2014). Brain-based origins of
change language: A beginning. *Addictive Behaviors*, 39, 1904-1910.

doi:10.1016/j.addbeh.2014.07.035

Fischer, D. J., & Moyers, T. B. (2014). Is there an association between empathic speech and
change talk in motivational interviewing sessions? *Alcoholism Treatment Quarterly*, 32, 3-18.

doi: 10.1080/07347324.2014.856225

Forsyth, J. P., & Eifert, G. H. (2007). *The mindfulness and acceptance workbook for anxiety*.

Oakland, CA: New Harbinger Publications.

Gaume, J., Bertholet, N., Faouzi, M., Gmel, G., & Daeppen, J.B. (2010). Counselor motivational

interviewing skills and young adult change talk articulation during brief motivational interventions. *Journal of Substance Abuse Treatment*, 39, 272–281.
doi:10.1016/j.jsat.2010.06.010

Gaume, J., Gmel, G., Faouzi, M., & Daeppen, J.B. (2008). Counselor behaviors and patient language during brief motivational interventions: a sequential analysis of speech. *Addiction*, 103, 1793 - 1800. doi: 10.1111/j.1360-0443.2008.02337.x

Gaume, J., Longabaugh, R., Magill, M., Bertholet, N., Gmel, G., & Daeppen, J.B. (2016). Under what conditions? Therapist and client characteristics moderate the role of change talk in brief motivational intervention. *Journal of Consulting and Clinical Psychology*, 84, 211-220. doi: 10.1037/a0039918

Glynn, L. H., Hallgren, K. A., Houck, J. M., & Moyers, T. B. (2012). CACTI: Free, Open-Source Software for the Sequential Coding of Behavioral Interactions. *PLoS ONE*, 7, e39740.
doi:10.1371/journal.pone.0039740

Hedeker, D., Gibbons, R. D., & Flay, B. R. (1994). Random-effects regression models for clustered data with an example from smoking prevention research. *Journal of Consulting and Clinical Psychology*, 62, 757–765. doi: 10.1037/0022-006X.62.4.757

Herzog, T. A., Lazev, A. B., Irvin, J. E., Juliano, L. M., Greenbaum, P. E., & Brandon, T. H. (2002). Testing for group membership effects during and after treatment: The example of group therapy for smoking cessation. *Behavior Therapy*, 33, 29–43. doi:10.1016/S0005-7894(02)80004-1

Hodgins, D. C., Ching, L. E., & McEwen, J. (2009). Strength of commitment language in motivational interviewing and gambling outcomes. *Psychology of Addictive Behaviors*, 23, 122-30. doi: 10.1037/a0013010

Houck, J., Moyers, T. B., Miller, W. R., Glynn, L., & Hallgren, K. (2013). *Motivational*

Interviewing Skill Code 2.5. Retrieved from <http://casaa.unm.edu/download/misc25.pdf>

- Hunter, J. A., Button, M. L., & Westra, H. A. (2014). Ambivalence and alliance ruptures in cognitive behavioral therapy for generalized anxiety. *Cognitive Behavior Therapy*, 43, 201-208. doi:10.1080/16506073.2014.899617
- Kertes, A., Westra, H. A., Angus, L., & Marcus, M. (2011). Client experiences of cognitive behavioral therapy for generalized anxiety disorder: The impact of adding motivational interviewing. *Cognitive and Behavioral Practice*, 18, 55–69. doi:10.1016/j.cbpra.2009.06.005
- Lombardi, D. R., Button, M. L., Westra, H. A. (2014). Measuring motivation: Change talk and counter-change talk in cognitive behavioral therapy for generalized anxiety. *Cognitive Behavior Therapy*, 43, 12-21. doi: 10.1080/16506073.2013.846400
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney, Australia: The Psychology Foundation of Australia.
- Magill, M., Gaume, J., Apodaca, T. R., Walthers, J., Mastroleo, N. R., Borsari, B., & Longabaugh, R. (2014). The technical hypothesis of motivational interviewing: A meta-analysis of MI's key causal model. *Journal of Consulting and Clinical Psychology*, 82, 973-983 doi: 10.1037/a0036833
- Martin, T., Moyers, T. B., Houck, J. M., Christopher, P. J., & Miller, W. R. (2005). *Motivational interviewing sequential code for observing process exchanges (MI-SCOPE) coder's manual*. Retrieved from <http://casaa.unm.edu/download/scope.pdf>
- Mattick, R., & Clarke, J. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behavior Research and Therapy*, 36, 455-470. doi: 10.1016/S0005-7967(97)10031-6
- Miller, W. R., Benefield, R. G., & Tonigan, J. S. (1993). Enhancing motivation for change in problem drinking: A controlled comparison of two therapist styles. *Journal of Consulting and*

- Miller, W. R., & Moyers, T. B. (2015). The forest and the trees: Relational and specific factors in addiction treatment. *Addiction*, 110, 401–413. doi:10.1111/add.12693
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York: Guilford Press.
- Miller, W. R., & Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist*, 64, 527–537. doi:10.1037/a0016830
- Moyers, T. B. (2014). The relationship in motivational interviewing. *Psychotherapy*, 51, 358–363. doi:10.1037/a0036910
- Moyers, T. B., Martin, T., Houck, J. M., Christopher, P. J., & Tonigan, J. S. (2009). From In-session behaviors to drinking outcomes: A causal chain for motivational interviewing. *Journal of Consulting and Clinical Psychology*, 77, 1113–1124. doi:10.1037/a0017189.supp
- Moyers, T. B., Martin, T., Manuel, J. K., Miller, W. R., & Ernst, D. (2010). *Manual for the revised global scales: Motivational interviewing treatment integrity 3.1.1* (MITI 3.1.1). Retrieved from <http://casaa.unm.edu/download/miti3.pdf>
- Peters, L. (2000). Discriminant validity of the Social Phobia and Anxiety Inventory (SPAI), the Social Phobia Scale (SPS) and the Social Interaction Anxiety Scale (SIAS). *Behavior Research and Therapy*, 38, 943–950. doi:10.1016/S0005-7967(99)00131-X
- Pirlott, A. G., Kisbu-Sakarya, Y., Defrancesco, C. A., Elliot, D. L., & Mackinnon, D. P. (2012). Mechanisms of motivational interviewing in health promotion: A Bayesian mediation analysis. *International Journal of Behavioral Nutrition and Physical Activity*, 9, 69.

- Rapee, R., Gaston, J., & Abbott, M. (2009). Testing the efficacy of theoretically-derived improvements in the treatment of social phobia. *Journal of Consulting and Clinical Psychology*, 77, 317-327. doi: 10.1037/a0014800
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.
- Raudenbush, S. W., et al. (2011). Optimal Design Software for Multi-level and Longitudinal Research (Version 3.01). Available from www.wtgrantfoundation.org.
- Romano, M. R., & Peters, L. (2014). Understanding the process of motivational interviewing: A review of the relational and technical hypotheses. *Psychotherapy Research*, 26, 220-240. doi: 10.1080/10503307.2014.954154
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, 86, 420–428. doi: 10.1037/0033-2909.86.2.420
- Sijercic, R., Button, M. L., Westra, H. A., & Hara, K. M. (2016). The interpersonal context of client motivational language in cognitive-behavioral therapy. *Psychotherapy*, 53, 13 – 21. doi: 10.1037/pst0000017
- Westra, H. A., Arkowitz, H., & Dozois, D. J. (2009). Adding a motivational interviewing pretreatment to cognitive behavioral therapy for generalized anxiety disorder: A preliminary randomized controlled trial. *Journal of Anxiety Disorders*, 23, 1106–1117. doi:10.1016/j.janxdis.2009.07.014
- Westra, H. A., Constantino, M. J., & Antony M. M (2016). Integrating motivational interviewing with cognitive-behavioral therapy for severe generalized anxiety disorder: An allegiance-controlled randomized clinical trial. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000098

- Westra, H. A., & Dozois, D. J. A. (2006). Preparing clients for cognitive behavioral therapy: A randomized pilot study of motivational interviewing for anxiety. *Cognitive Therapy and Research*, 30, 481–498. doi:10.1007/s10608-006-9016-y
- Westra, H., & Dozois, D. (2008). Integrating motivational interviewing into the treatment of anxiety. In H. Arkowitz, et al. (Eds.). *Motivational interviewing in the treatment of psychological problems*. New York: Guilford.
- Vader, A. M., Walters, S. T., Prabhu, G. C., Houck, J. M., & Field, C. A. (2010). The language of motivational interviewing and feedback: Counselor language, client language, and client drinking outcomes. *Psychology of Addictive Behaviors*, 24, 190-197. doi: 10.1037/a0018749

Table 1.

Comparison of baseline demographic characteristics of participants in TEE (n = 79) vs. SC (n = 40)

	Total	TEE	SC	χ^2	<i>t</i>	<i>P</i>
<u>Continuous</u>						
<u><i>M (SD)</i></u>						
Age	30.96 (9.92)	29.97 (8.35)	32.90(12.34)		-1.53	.129
SIAS	56.60 (10.83)	56.51 (9.82)	56.78(12.76)		-.127	.899
DASS	9.99 (5.28)	10.32 (5.34)	9.35(5.15)		.943	.347
Importance	18.29 (2.15)	18.10 (2.23)	18.65 (1.96)		-1.32	.190
Confidence	15.05 (2.98)	14.75 (3.22)	15.65 (2.36)		-1.57	.119
<u>Categorical</u>						
<u><i>f (%)</i></u>						
Male	63 (53%)	46 (58%)	17(43%)	2.64		.104
Country of origin – Australia	85 (71%)	59 (75%)	26 (65%)	5.86		.210
Identification with other ethnic group	31 (26%) ^a	19 (24%) ^b	12 (30%)	.488		.485
Education - Bachelor degree or higher	60 (50%)	37 (47%)	23 (58%)	3.39		.908
Employed	62 (52%)	38 (48%)	24 (60%)	4.21		.756
Never married	83 (70%)	58 (73%)	25 (63%)	1.94		.747
Additional diagnosis ^c	65 (55%)	44 (56%)	21 (53%)	.11		.741
GAD	33	22	11			
MDD	33	25	8			
Specific Phobia	19	15	4			
Dysthymia	11	7	4			
OCD	4	3	1			

Other	10	4	6		
APD	65 (55%)	43 (54%)	22 (55%)	.00	.953
Current Medication	36 (30%)	29 (37%)	7 (18%)	4.64	.031

Note. TEE = Treatment expectations and engagement; SC = Supportive counseling; SIAS = Social Interaction and Anxiety Scale; DASS = Depression Anxiety and Stress Scales; GAD = Generalized anxiety disorder; MDD = Major depressive disorder; OCD = Obsessive compulsive disorder; APD = Avoidant personality disorder

^a In the TEE condition seven participants identified as Chinese, three as Italian, and nine participants identified with one each of the following ethnic groups; British, Hungarian, Indian, Korean, Latin American, Muslim, Nepalese, Persian, and Turkish.

^b In the SC condition three participants identified as Chinese, two as Indian, and seven participants identified with one each of the following ethnic groups; Anglo-Asian, Filipino, Hispanic, Latin American, South Korean, Taiwanese, and Vietnamese.

^c The number of additional Axis 1 diagnoses does not equate to the percentage of the sample as some participants had more than one additional diagnosis

Table 2.

Comparisons of MISC behavior codes between TEE (n = 79) and SC (n=40) conditions

	TEE	SC	<i>t</i>	<i>P</i>
	<i>M (SD)</i>	<i>M (SD)</i>		
CT	38.43 (21.40)	1.58 (2.91)	10.82	< .001
CCT	14.90 (12.04)	.38 (.84)	7.60	< .001
FN	91.76 (39.90)	153.33 (55.78)	-6.93	< .001
MICO	85.58 (27.32)	80.50 (32.39)	.90	.370
MIIN	5.06 (6.15)	.50 (1.09)	4.65	< .001
Other	82.01 (30.45)	102.70 (49.48)	-2.82	.006
OQ	23.85 (12.93)	21.25 (13.28)	1.03	.307
CQ	30.95 (14.94)	67.25 (40.06)	-7.15	< .001
RPOS	13.99 (7.65)	.20 (.46)	11.37	< .001
RNEG	5.94 (.08)	5.23 (.35)	7.03	< .001
RBOTH	1.15 (1.49)	0 (0)	4.89	< .001
ROther	14.80 (9.52)	47.88 (22.30)	-11.33	< .001
oMICO	25.86 (14.32)	11.10 (6.44)	6.20	< .001
Acceptance	4.38 (.67)	4.45 (.55)	-.57	.567
Empathy	4.56 (.64)	4.38 (.77)	1.37	.174
Direction	4.56 (.69)	1 (.00)	32.38	< .001
MI Spirit	4.00 (.53)	3.64 (.17)	4.27	< .001
Self Exploration	4.22 (.79)	4.50 (.75)	-1.88	.063

Note. TEE = Treatment expectations and engagement; SC = Supportive counseling; CT = change talk; CCT = counter-change talk; FN = follow/neutral; MICO = MI-consistent behavior; MIIN = MI-Inconsistent behavior; OQ = open questions; CQ = closed questions; RPOS = reflections of CT; RNEG = reflections of CCT; RBOTH = reflections of both CT and CCT; ROther = reflections of neutral client language; Other = comprised of closed questions, giving information, structure, filler, and facilitate); oMICO = comprised of affirm, support, advise with permission, raise concern with permission, reframe, and emphasize control.

Table 3.

Regressions analyses for therapist MISC behaviors predicting change talk and counter-change talk

Predictor	<u>Change Talk</u>				<u>Counter-Change Talk</u>			
	β	<i>SE</i>	<i>t</i>	<i>p</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
FN	-.02	.16	-.13	.897	-.14	.16	-.89	.379
MI Spirit	.47	.14	3.37	.001	.48	.14	2.28	.001
MICO	.15	.15	1.03	.306	.22	.15	1.51	.135
MIIN	.17	.14	1.18	.242	.31	.14	2.28	.025

Note. β = standardized coefficient; *SE* = Standard Error; FN = Follow/neutral; MICO = MI-consistent behavior; MIIN = MI Inconsistent behavior

Table 4.

Regressions analyses for specific therapist behaviors predicting change talk and counter-change talk

Predictor	<u>Change Talk</u>				<u>Counter-Change Talk</u>			
	β	<i>SE</i>	<i>t</i>	<i>p</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
FN	.18	.04	1.35	.182	.23	.12	1.92	.059
MI Spirit	.25	1.28	1.96	.054	.29	.11	2.59	.012
MIIN	.06	.12	.47	.640	.23	.11	2.12	.038
OQ	.09	.11	.82	.415	.08	.10	.77	.442
CQ	-.46	.14	-3.37	.001	-.47	.12	-3.90	< .001
RPOS	.51	.10	4.98	< .001	.11	.09	1.20	.234
RNEG	-.05	.11	-.50	.619	.58	.09	6.25	< .001
RBOTH	.05	.10	.47	.641	-.03	.09	-.38	.709
oMICO	.10	.12	.83	.407	.03	.11	.28	.784

Note. β = standardized coefficient; *SE* = Standard Error; FN = follow/neutral; MIIN = MI-inconsistent behavior; OQ = open questions; CQ = closed questions; RPOS = reflections of CT; RNEG = reflections of CCT; RBOTH = reflections of both change talk and counter-change talk; oMICO = comprised of affirm, support, advise with permission, raise concern with permission, reframe, and emphasize control.

Table 5.

Multilevel model of the effect of client behavior on anxiety outcome

Fixed Effect	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept of SIAS				
Time	-9.38	.80	-11.78	< .001
Condition	-29.88	19.02	-1.57	.119
Medication Status	-3.60	2.15	-1.67	.097
CT	-.12	.87	-1.6	.111
CCT	.09	.13	.64	.523
FN	-.02	.02	-.98	.332
Condition X CT	.76	.80	-.95	.346
Condition X CCT	1.45	2.77	-.53	.601
Linear slope of SIAS				
CT X Time	.03	.05	.68	.500
CCT X Time	-.09	.10	-.83	.406

Note. β = standardized coefficient; *SE* = Standard Error; SIAS = Social Anxiety Severity Scale; Condition = SC (coded 0) or TEE (coded 1); CT = change talk; CCT = counter-change talk; FN = follow/neutral

Table 6.

Multilevel model of the effect of therapist behaviors on anxiety outcomes

Fixed Effect	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept of SIAS				
Time	-9.45	.80	-11.85	< .001
Condition	-4.74	5.54	-.86	.394
Medication Status	-2.52	2.18	-1.16	.250
MICO	-.07	.05	-1.42	.159
MIIN	.27	.27	1.0	.320
MI Spirit	-.20	2.98	-.07	.946
Condition X MICO	.14	.07	2.03	.045
Condition X MIIN	-.34	1.61	-.21	.832
Condition X MI Spirit	-15.80	15.10	-1.05	.298
Linear slope of SIAS				
MICO X Time	-.02	.03	-.74	.460
MIIN X Time	-.12	.12	-.74	.458
MI Spirit X Time	.58	1.83	.32	.754

Note. β = standardized coefficient; *SE* = Standard Error; SIAS = Social Anxiety Severity Scale; Condition = SC (coded 0) or TEE (coded 1); MICO = MI-consistent behavior; MIIN = MI-inconsistent behavior.

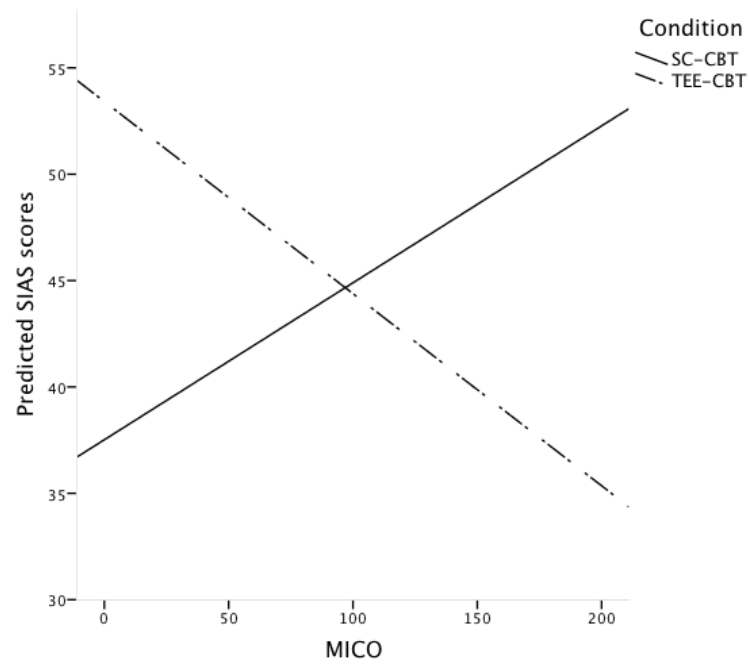


Figure 1. Plot of interaction between MICO behaviors and Condition in predicting SIAS scores.

Appendix

Table 1.

Cohen's kappa and intra-class correlations (ICC) for MISC behavior codes for TEE (n= 16) and SC (n=8)

	TEE (Frequency)	SC (Frequency)
Cohen's kappa		
<u>Therapist behaviors</u>		
Advise with permission	.55 (55)	-
Advise without permission	.64 (26)	-
Affirm	.95 (172)	.79 (42)
Confront	.33 (8)	.00 (1)
Direct	.68 (19)	.00 (1)
Emphasize control	.66 (55)	.18 (1)
Facilitate	.95 (75)	.67 (7)
Filler	.75 (7)	.00 (1)
Giving information	.88 (385)	.76 (130)
Open questions	.97 (401)	.87 (146)
Closed questions	.95 (432)	.86 (365)
Raise concern with permission	-	-
Raise concern without permission	-	-
Simple reflections (neutral)	.88 (141)	.76 (278)
Simple reflections (of CT)	.79 (63)	.00 (1)
Simple reflections (of CCT)	.91 (32)	-
Simple reflections (of CT/CCT)	.80 (3)	-
Complex reflections	.90 (147)	.51 (70)
Complex reflections (of CT)	.92 (135)	-
Complex reflections (of CCT)	.96 (48)	-

Complex reflections (of CT/CCT)	.86 (16)	-
Reframe	.75 (7)	.33 (1)
Support	.90 (63)	.72 (37)
Structure	.90 (207)	.78 (47)
Warn	-	-
<u>Client behaviors</u>		
Follow/neutral	.95 (1412)	.99 (974)
CT		
Commitment	.88 (34)	1 (1)
Reasons	.91 (360)	.00 (2)
Desire	.89 (66)	1 (1)
Ability	.74 (21)	1 (2)
Need	.91 (19)	-
Taking steps	.79 (17)	1 (1)
Other	.70 (59)	-
CCT		
Commitment	1 (2)	-
Reasons	.90 (120)	-
Desire	.67 (4)	-
Ability	.87 (80)	-
Need	-	-
Taking steps	.00 (3)	-
Other	.76 (18)	-
ICC		
<u>Recoding into six categories^a</u>		
MICO	.990	.995
MIIN	.533	.632
Other	.965	.948

CT	.959	.949
CCT	.994	1
FN	.971	.999
<u>Recoding into nine categories</u>		
oMICO	.956	.850
RPOS	.937	1
RNEG	.887	1
RBOTH	.982	1
ROther	.937	.974
Open questions	.993	.955
Closed questions	.987	.983
<u>Global Ratings</u>		
Acceptance	.906	.563
Empathy	.670	.533
Autonomy Support	.533	1
Direction	.783	.432
Collaboration	.730	.632
Evocation	.854	1
Self-Exploration	.892	.976

Note. CT = change talk; CCT = counter-change talk; MICO = MI-consistent behaviors (open questions, simple and complex reflections, affirm, support, reframe, emphasize control, advise with permission, and raise concern with permission); MIIN = MI-Inconsistent behaviors (confront, warn, direct, advise without permission, and raise concern without permission); Other (closed questions, giving information, structure, filler, and facilitate); oMICO = Other MICO behaviors (comprised of affirm, support, advise with permission, raise concern with permission, reframe, and emphasize control); RPOS = all reflections with a positive valence (reflections of CT); RNEG = all reflections of a negative valence (reflections of CCT); RBOTH = combination reflections (+/-) were combined (reflections of both CT and CCT); ROther = all neutral reflections were combined together; - = code was not present in session.

^aFrequencies corresponding to ICC's are presented in the body of the manuscript.

Chapter 7

General Discussion.

Overview

Motivational Interviewing (MI) has shown promise as an adjunctive treatment for anxiety disorders, with research showing that clients who receive MI alongside traditional treatments for anxiety, namely cognitive behavior therapy (CBT), are more engaged during CBT (Aviram & Westra, 2011; Westra, Arkowiz, & Dozois, 2009), and show greater improvements on outcome variables (Westra et al., 2009; Westra, Constantino, & Antony, 2016). However, there are mixed results in terms of improvements in client engagement and outcome and there is limited research that investigates how MI generates positive effects in anxious populations. Therefore, the current thesis sought to examine MI mechanisms in the context of anxiety disorders, first by reviewing the current state of evidence, and second by empirically investigating proposed mechanisms in an MI treatment for social anxiety disorder (SAD). In this final chapter the findings from each of the two review and three empirical papers will be discussed. Then, a summary of the theoretical and clinical implications of these results, limitations of the current research, and recommendations for future research will be presented.

The relational and technical hypotheses of motivational interviewing

The first aim of the current thesis was to review evidence for the MI causal model proposed by Miller and Rose (2009). Chapter Two provided a systematic review of the relational (that a therapist/client relationship characterized by MI Spirit and empathy can evoke behavior change) and technical (that therapist directive and proficient use of MI-consistent behaviors (MICO) will elicit and reinforce language in favor of change (CT), and this CT is related to client outcome) hypotheses in a variety of treatment domains, specifically by examining evidence for each path of Miller and Rose's causal chain model. Thirty-seven studies were available for review, with most studies employing substance-using populations, though there was a representation of research in the areas of diet and exercise, antiretroviral

therapy adherence, and partner aggression. Overall, the results provided support for the link between therapist MI-consistent behaviors (MICO) and client change language, and between client language and treatment outcome. However, few studies specifically tested the role of change talk (CT) as a mediator of treatment outcome and there was inconsistent support for the effect of MICO on treatment outcome. In terms of the relational hypotheses, therapist relational style factors were not consistently related to change language or outcome, however studies that employed experimental designs that isolated the effect of MI relational components did demonstrate positive effects of therapist interpersonal style (Miller, Benefield, & Tonigan, 1993; Morgenstern et al., 2012).

While the review aimed to examine the MI causal model in a variety of treatment domains, it was dominated by studies conducted within the realm of substance abuse. This is likely due to the fact that MI originated to treat substance use disorders, though given growing evidence for the efficacy of MI in the treatment of clinical mental health conditions the findings called for a more specified examination of MI processes. Therefore, Chapter Three aimed to examine MI mechanisms not restricted to the MI causal model in populations diagnosed with mood, anxiety, eating, and psychotic disorders, and patients with comorbid mental health conditions.

MI mechanisms of change in the treatment of mental health problems

Chapter Three presented a review and meta-analysis of MI mechanisms of change in the context of mood, anxiety, psychotic and eating disorders, and patients with comorbid conditions. The review drew on the meta-analysis of Apodaca and Longabaugh (2009) as a framework for investigating potential MI mechanisms. Following the study methodology of Apodaca and Longabaugh, studies were selected for review that investigated patient behaviors (motivation, confidence, engagement, resistance, and experience of discrepancy) and therapist behaviors (MICO, MI-inconsistent behaviors (MIIN), MI Spirit and empathy). Overall, the

research was limited, first in terms of the number of studies that had examined potential MI mechanisms (either as the aim of the paper or as part of a broader assessment of MI treatment), and second, in terms of the number of mechanisms that had been examined. However, pooled effect sizes did demonstrate that the application of MI was related to specific therapist and client behaviors, and that patient behaviors may predict treatment outcome. Moreover, there did appear to be some support for the effect of MI in increasing motivation and treatment engagement (homework compliance and treatment attendance), particularly in the context of anxiety disorders. Though a caveat of the effect of MI on motivation and engagement is that studies generally did not employ control conditions, thus the finding may be attributed to increased client/therapist contact, as opposed to MI therapy specifically. Given that both therapist behaviors and client change language are deemed to be fundamental to the process of MI (Miller & Rose, 2009) it was surprising that only two studies had examined therapist behaviors, and no studies had examined client language. Albeit, research has since demonstrated that change language and therapist MI Spirit may be relevant to the process of MI in the anxiety disorders (for example; Aviram, Westra, Constantino, & Antony, 2016; Button, Westra, Constantino, & Antony, 2015; Constantino, Westra & Antony, 2015).

Taken together, the review papers presented in Chapters Two and Three suggested that while there is evidence for the MI causal chain, and support for potential MI mechanisms particularly in the context of anxiety disorders, there is a need to further examine the process of MI in treatment domains beyond substance use and to examine the effects of MI in the presence of control conditions. Therefore, the final three papers of this thesis aimed to address the gap in research empirically by examining MI processes in the context of anxiety disorders, and specifically social anxiety disorder (SAD). Furthermore, Chapter Four and Chapter Six aimed to overcome an aforementioned limitation of past research by comparing MI to an active control condition.

The role of ambivalence in MI-CBT for social anxiety disorder

One reason that MI is thought to translate well to a variety of treatment domains is due to the focus on client ambivalence (Arkowitz, Miller, & Rollnick, 2015; Arkowitz, Westra, Miller, & Rollnick, 2008). It is surprising that while one of the main aims of MI is to resolve ambivalence, the ability of MI to actually decrease ambivalence (as opposed to increase motivation) has generally been overlooked, therefore Chapter Four aimed to explore ambivalence in the context of an MI-style pre-treatment for SAD. It was expected that clients with social anxiety may express ambivalence in relation to both change in general and the process of change, that is, engaging in CBT, and that different types of ambivalence may have different effects. Therefore, the study utilized a variety of self-report measures of ambivalence and analysis techniques in order to assess three distinct aims; 1) First, to examine whether participants who received MI show decreases in general ambivalence to change and in ambivalence towards CBT therapy specifically; 2) Second, to examine the relationship between ambivalence about specific elements of CBT therapy and client social anxiety; 3) and third, to assess whether ambivalence is related to treatment outcome following a group CBT program.

Overall, findings of Chapter Four were mixed. Results revealed that preparatory MI prior to CBT for social anxiety did not decrease client ambivalence, and surprisingly both treatment conditions (the MI treatment (Treatment Expectations and Engagement (TEE)) and supportive counseling (SC)), showed increases in ambivalence on the change questionnaire (CQ; Brody, Arkowitz, & Allen, 2008). There were no differences between condition on task-related ambivalence during CBT, which is not surprising given that groups did not differ in levels of ambivalence after phase one and prior to embarking on CBT. Overall, there were positive associations between task-related ambivalence and ratings of social anxiety symptoms during week 6 to 12 of the CBT program, with the cross-lagged panel analysis particularly highlighting a strong relationship between ambivalence about receiving feedback

for a speech task at CBT session 9 and anxiety scores at CBT session 11. These findings suggest that perhaps tasks that are more distressing are associated with higher levels of ambivalence and it may be beneficial to use an MI-approach in order to encourage clients to weigh up the costs (distress) and benefits (exposure practice) before or after undertaking the CBT task. In terms of the relationship between MI and CBT treatment outcome, in general, findings were dependent on the measurement of ambivalence and also the condition to which clients were allocated. That is, baseline treatment ambivalence relating to Adverse Reactions to Treatment was a significant predictor of anxiety outcome severity, after controlling for levels of general psychological distress. The conditional effect of Personal Consequences of Treatment was also significant, though the main effect was not. Total scores on the Treatment Ambivalence Questionnaire (TAQ; Rowa et al., 2014), TAQ Inconvenience of Treatment, baseline CQ scores, and CQ difference scores did not predict treatment outcome. These findings suggest that ambivalence specifically related to fears of increasing anxiety symptoms or relapse, for example, predicts higher ratings of anxiety symptoms. Also, there was a significant interaction between personal consequences and treatment condition, and between CQ scores and condition. Similarly, the interaction between treatment condition and baseline Adverse Reactions to Treatment approached significance. The interaction was such that those clients high in ambivalence in the TEE group had better outcome than those higher in ambivalence in the SC group. On the other hand, clients with low levels of ambivalence appeared to have better outcome in the SC group than the TEE group. However anxiety severity seemed to remain relatively stable across levels of ambivalence for the TEE group, which seems to suggest that MI may alleviate the negative impact of ambivalence on post treatment outcome severity, which coincides with research by Button et al. (2015).

Overall, Chapter Four provided mixed support for the relationship between MI and ambivalence in a socially anxious population. MI was not shown to reduce ambivalence, either general ambivalence, treatment ambivalence, or ambivalence related to specific CBT

tasks, however the condition to which participants were allocated did moderate the effect of some measures of baseline ambivalence on treatment outcome, suggesting that while MI might not decrease ambivalence it may alleviate a negative effect of ambivalence on treatment outcome. Also, higher CBT task-related ambivalence was related to higher social anxiety symptoms during CBT, which may be an important finding for CBT treatment more generally.

Therapist and client interactions in MI for social anxiety disorder

Chapter Five sought to employ the transition analysis technique to investigate the bidirectional associations between therapist and client speech during TEE sessions for SAD, thus attempting to establish support for the first link of the MI causal model in the context of SAD. Therapist and client behaviors were coded using the Motivational Interviewing Skill Code 2.5 (MISC 2.5; Houck, Moyers, Miller, Glynn, & Hallgren, 2013). Consistent with the proposed causal chain of MI, therapist MICO behaviors were more likely to precede client CT, while MIIN behaviors were more likely to precede neutral client language and less likely to precede client CT. MICO behavior was also more likely to precede counter-change talk (CCT), suggesting that it may facilitate change exploration in general. The findings aligned with previous research examining behavior transitions during MI therapy, albeit within substance using populations (Apodaca et al., 2016; D'Amico et al., 2014; Gaume, Gmel, Faouzi, & Daeppen, 2008; Gaume, Bertholet, Faouzi, Gmel, & Daeppen, 2010; Moyers, Martin, Houck, Christopher, & Tonigan, 2009). Furthermore, the findings highlighted the importance of particular types of MICO behaviors, particularly open questions and valenced reflections. That is, positive reflections were more likely to both precede and follow CT, while negative reflections were more likely to precede and follow CCT. These findings correspond with past research (e.g., Barnett et al., 2014; D'Amico et al., 2014; Moyers et al., 2009) and also the theoretical importance of reflective language in MI, given that reflections highlight clinician empathic awareness and can also be used to differentially reinforce aspects

of client speech, in this case CT and CCT. In concordance with MI theory, MIIN behaviors were less likely to both precede and follow CT. It was unexpected that MIIN behaviors did not significantly transition to CCT utterances, as demonstrated in previous research (Gaume et al., 2010). However, MIIN behaviors were more likely to both precede and follow client neutral language, a finding consistent with the research of Gaume et al. (2008).

In terms of the effect of client language on therapist behavior, overall, when clients made any type of change exploration utterance, it was more likely to be followed by MICO therapist behaviors. Talk towards change (CT) was less likely to be followed by MIIN behaviors, while neutral language was more likely to be followed by MIIN or Other therapist behavior. This finding demonstrates that language used by socially anxious clients may impact therapist responses and thus, in turn, impact their own level of change exploration. These results are important, given the proposed causal chain of MI and indicate the replicability of the causal chain across disorders.

Taken together, the findings of Chapter Five supported the first step of the MI causal model in the context of social anxiety, though the study did not examine whether therapist and client behaviors predicted treatment outcome. Thus, the final chapter of this thesis had this as an aim.

An examination of the MI causal model in an MI pre-treatment for social anxiety disorder

Chapter Six broadened the scope of research in three ways: 1) Comparing TEE sessions to a supportive counseling control condition (SC) on MISC 2.5 behavior codes; 2) Examining the effect of relational components on client language, namely MI Spirit; and 3) Examining therapist and client behaviors as predictors of CBT treatment outcome.

Overall, the results provided mixed support for study hypotheses. In terms of MISC behavior codes, TEE therapists did not demonstrate more MICO behaviors, Acceptance or

Empathy, but were rated higher on MI Spirit and Direction. They also demonstrated more reflections of change language, which coincided with higher frequencies of client CT and CCT in the TEE conditions. Surprisingly, there were significantly more MIIN behaviors in the TEE condition than in the SC condition, which might be attributed to the more directive nature of the TEE sessions. MIIN behavior counts in the TEE sessions were rare, and especially relative to MICO behaviors (on average there were 17 times more MICO behaviors than MIIN), suggesting that for the most part TEE therapists behaved in an MI consistent manner.

In examining the relationship between therapist behaviors and client language, neither MICO nor MIIN behaviors were correlated with CT or CCT, though MIIN behaviors did predict a greater frequency of CCT in regression analyses. Regression analyses further corroborated the bivariate correlations between MI Spirit and CT and CCT, and also pointed to specific therapist behaviors that may increase the likelihood of change language (valenced reflections) or may be unhelpful in eliciting change language (closed questions). These findings support the results of Chapter Five in relation to valenced reflections and closed questions whereby CT and CCT were more likely to follow a therapist reflection that matched the valence of the change language, and where both CT and CCT were less likely to occur following closed questions. However, the findings contradict those of Chapter Five in relation to open questions, where Chapter Five found that change language (CT and CCT) was more likely to follow open questions the current study found that open questions did not predict change language. Perhaps this is due to the analysis technique used in the two studies. It is possible that the overall frequency of open questions is not related to more change language during a TEE session, though they may be more likely to transition to CT and CCT compared to other behavior categories. Furthermore, this inconsistency might highlight a need to examine the content of the open question. Chapter Two demonstrated, that in general research has not shown a consistent relationship between open questions and change language,

however valenced questions (questions about positive or negative aspects of the target behavior) have been shown to relate to change language (Moyers et al., 2009). Perhaps the majority of open questions in TEE sessions were not specifically directed at asking about change, which may be an important factor to investigate in future research in terms of whether an open question predicts more client change language or not.

The findings that MI spirit (the cumulation of evocation, autonomy support, and collaboration) emerged as a predictor of both CT and CCT support the role of an MI relational style as having an impact on client behavior (Moyers, 2014). However, MI Spirit appeared to have a stronger relationship with CCT, at least within the current sample. Nevertheless, the findings highlight the importance of the therapist relational style compared to the general category of MICO behaviors and perhaps demonstrate that MI Spirit might be particularly important for clients who are socially anxious.

Contradictory to study hypotheses, therapist and client behaviors, namely, therapist MICO, MIIN, and MI Spirit, and client CT and CCT did not predict treatment outcome. These results do not coincide with the MI causal model, or with research that has investigated change language in anxious populations (e.g., Button et al., 2015 and Lombardi, Button, & Westra, 2014). The results may be attributed to study methodology and population. Firstly, perhaps because the current study did not integrate MI throughout CBT as in Button et al. (2015) clients were not continually primed to their initial reasons to change or maintain their behavior and thus earlier language did not influence their actions within the group program and during the follow-up period. Aside from differences in methodology, the aforementioned studies used participants diagnosed with generalized anxiety disorder. Given that social anxiety centers around a fear of feeling embarrassed or judged by others it may effect how socially anxious clients discuss change with TEE therapists and their ability to truthfully express their feelings about change. Thus, the crux of social anxiety might affect the relationship between the expression of change language and outcome. In drawing together

findings from Chapter Four and Chapter Six this idea might be supported. In Chapter Four the results suggested that higher levels of self-reported ambivalence (specifically about adverse reactions to treatment) predicted CBT treatment outcome. Though Chapter Six demonstrated that CCT (a behavioral marker of ambivalence) does not predict treatment outcome. This inconsistency may be attributed to the methodology of measurements of ambivalence but it may also speak to the idea that socially anxious clients may be more open in expressing ambivalence as rated in a self-report measure as opposed to expressing ambivalence in the presence of another person, and that this might explain why a self-report measure links to anxiety symptoms following treatment, while in-session CCT does not. However, given the correlational nature of the study design it is difficult to pinpoint exactly why baseline self-report ambivalence did predict increased social anxiety symptoms.

Given that client CT and CCT, and therapist MICO, MIIN and MI Spirit did not predict treatment outcome, the findings of Chapter Six did not provide evidence for the second path of the MI causal model in the context of SAD. However, the condition to which participants were allocated to did moderate the relationship between MICO behaviors and outcome, where a greater frequency of MICO behaviors in the TEE group was associated with better treatment outcome, while fewer MICO behaviors were associated with worse treatment outcome. On the other hand for the SC group, fewer MICO behaviors were linked to better treatment outcome, and more MICO behaviors were linked to worse treatment outcome. This finding may be attributed to the type of MICO behaviors prevalent in each condition, with a greater frequency of valenced reflections, affirmations, emphasizing control, and advising with permission in the TEE condition compared to the SC condition. These skills are perhaps more relevant to facilitating change and highlighting the client's autonomy in the change process which could affect the clients engagement during CBT and commitment to maintaining lower levels of anxiety following treatment. However, this does not explain why fewer MICO behaviors were associated with either worse outcome for the TEE group or

better outcome for the SC group. In this instance, the effect of MICO on outcome could be attributed to doing the right thing at the right time. Given that the purpose of the SC group was for the clients to discuss their life history in a non-directive manner, perhaps clients whose therapists remained relatively quiet (as opposed to frequently asking questions or offering reflections) had better outcome because they had a greater opportunity for self-guided self-exploration, and the SC sessions functioned as practice in exposure, which better prepared them for the CBT group. Because the TEE sessions had a specific aim and structure that focused on change it may be damaging if therapists do not frequently use behaviors that are consistent with this process. One other point worth noting is that perhaps it is the combination of skills in the MI sessions that contributes to a moderation effect. Gaume et al. (2014) found that if the therapist demonstrated between 0-49 MICO behaviors this predicted better outcome but if there were 50 or more MICO behaviors this was not related to outcome. These results suggest that perhaps it is the exact frequency and combination of behaviors during MI that contributes to MI efficacy. In the current study it is possible that a high level of MICO behaviors corresponds to better outcome for an MI treatment because they are combined with other aspects of MI, including a specific relational style and purpose.

Overall, the results of Chapter Six supported some elements of the MI causal model in the context of SAD, but not all. First, the TEE condition was generally distinguishable from the SC condition according to MISC 2.5 behavior categories, which suggests that TEE was being conducted in an MI fashion. Second, while the MICO behavior category did not predict change language, MI Spirit and specific therapist behaviors did, with MIIN also predicting a greater frequency of CCT. Lastly, therapist and client behaviors did not predict treatment outcome, thus the role of client language as a mediator of treatment outcome was not investigated.

Taken together, the results of the empirical papers suggest that elements of the theorized process of MI are relevant to social anxiety treatment, and that while not all hypotheses were supported, there is reason to suggest that these processes should be further investigated within this context. Furthermore, an overall implication of the current thesis is that while each chapter contributes to MI process research, they also highlight the complexity associated with understanding how particular MI mechanisms or treatment ingredients contribute to outcome. For example, while there tends to be evidence for the MI causal model within the substance use domain, there is discrepancy about which therapist or client behaviors link to treatment outcome. In Chapter Three there was evidence that MI did increase motivation for anxiety disorders, but not more so than comparison conditions. Furthermore, Chapter Four demonstrated that MI does not decrease ambivalence for socially anxious clients, though baseline levels of ambivalence are moderated by treatment condition. In terms of the MI causal model for SAD, though specific therapist behaviors were more likely to be followed by change exploration as seen in Chapter Five, Chapter Six highlighted the role of MI Spirit as a predictor of change language. Overall though, Chapter Six provided no support to the final link of the causal model in that therapist and client behaviors were not related to CBT treatment outcome.

The findings of the current thesis have implications for the process of MI in general, and also in the context of SAD specifically. The following section will discuss theoretical and clinical implications of the findings in regards to proposed MI mechanisms and the implied causal model of MI. Then implications for the process of MI in the context of SAD will be discussed. Finally, limitations and directions for future research will be presented.

Implications of the current findings for the MI causal model/ MI processes

Both therapist and client behaviors are thought to be of importance to understanding the efficacy of MI. Amongst the theoretical frameworks and empirical research surrounding

MI, two components are consistently emphasized as being fundamental to the efficacy of MI. The first is the client-centered therapy style, a non-confrontational way of interacting with clients that does not force change upon them, and the second is the facilitation of client's expression of CT (Miller & Rollnick, 1991, 2002, 2013). Miller and Rose (2009) have proposed two causal hypotheses (relational and technical) and a corresponding causal model arising from these components that may account for the effect of MI. At present, these hypotheses appear to offer the most pragmatic account of how MI may produce change, and have been the mostly widely researched. The technical hypothesis has generally been supported in the substance use domain (as seen in Chapter Two), and research is beginning to demonstrate the effect of the relational component on treatment outcome (for example; Aviram et al., 2016; Borsari et al., 2014; Bertholet, Palfai, Gaume, Daeppen; Copeland, McNamara, Kelson, & Simpson, 2015).

The empirical studies of the current thesis provided support for the first link in the causal chain, indicating a relationship between MI-therapist behaviors and relational style and client change language in the context of SAD. However, MI therapist and client behaviors were not related to CBT treatment outcome. Thus, one implication of the current thesis is that perhaps these behaviors are not relevant to social anxiety outcome severity or perhaps the pathway from therapist/client language to outcome in the proposed causal model is too simplistic in this context. One of the biggest distinctions between using MI to treat substance abuse compared to MI for anxiety disorders (or other psychiatric conditions) is that typically MI is used as a stand-alone treatment for substance abuse (Moyers, 2011), whereas in the treatment of anxiety disorders, MI is used as an adjunctive treatment, often paired with CBT, either as a pre-treatment or integrated throughout the CBT program. Thus, the relationship between MI therapist or client behaviors and outcome is potentially more complex and may involve the interplay of MI relevant behaviors with the process of CBT therapy also. For example, therapists offering MI consistent advice during an MI pre-treatment might affect

whether the client engages in homework, or remains motivated in the face of challenging exposure exercises during CBT, as opposed to predicting their anxiety severity in the follow-up period. In line with this idea, past research has shown that MI predicts decreased resistance during CBT, and it is this resistance that is linked to outcome (Aviram & Westra, 2011, Constantino et al., 2015).

One set of behaviors that may be particularly relevant to the process of MI in the treatment of anxiety is client engagement behaviors. The third edition of *Motivational Interviewing* (Miller & Rollnick, 2013) suggests that an important element of MI's effectiveness is the therapist successfully engaging the client in therapy. Research has demonstrated a link between therapist style variables and client engagement (Boardman, Catley, Grobe, Little, & Ahluwalia, 2006; Catley et al., 2006; Moyers, Miller, & Hendrickson, 2005; Pirlott, Kisbu-Sakarya, Defrancesco, Elliot, & Mackinnon, 2012), and there is some suggestion that MI has a positive effect on the therapist/client's working alliance (Crits-Cristoph et al., 2009), a construct akin to Miller and Rollnick's process of engagement. Furthermore, psychotherapy literature in various treatment domains has shown client engagement behaviors to relate to outcome (Tetley, Jinks, Huband, & Howells, 2011). Findings from Chapter Three supported the role of MI in enhancing engagement, specifically in terms of increasing attendance and treatment uptake, or increasing homework compliance and decreasing resistance, and supported a link between engagement variables and outcome. Furthermore one study has specifically demonstrated that counteracting client resistance during CBT with MI spirit and empathy leads to decreased resistance and better treatment outcome (Aviram et al., 2016). These findings are promising given that one of the main aims of adjunctive MI for anxiety disorders is to enhance client engagement with typical treatments and elements of the MI causal model might provide an explanation of how MI enhances engagement. Therefore, the implication is that perhaps in applying the MI causal model to an MI pre-treatment for social anxiety, additional paths may be required that link MI therapist

and client behaviors to engagement behaviors during CBT for example. The idea being that particular therapist behaviors and client language could influence engagement behaviors, and that greater engagement may enhance treatment outcome, and idea that could be explored in future research.

Not only could typical MI process variables effect engagement with the adjunctive CBT treatment but they might also be related to, or moderate, the effect of client individual difference factors on outcome. While the current thesis did not find a link between therapist/client behavior variables and outcome, the findings of Chapter Three supported a link between motivation and outcome for anxious clients (albeit only one study was examined) and Chapter Four pointed to a relationship between ambivalence (particularly ambivalence surrounding adverse reactions to treatment) and treatment outcome. Moreover, the relationship between ambivalence and treatment outcome was moderated by treatment condition, such that MI appeared to somewhat alleviate the effects of high levels of pre-treatment ambivalence on treatment outcome. This finding begs the question of how MI contributed to this effect? The findings could be related to the actions of client and therapist during the MI session. Perhaps clients in MI became more aware of their reasons to change or factors that could impede the change process through the expression of change language, or perhaps specific therapist effects like MI Spirit, acceptance, and support continued to encourage the client throughout the CBT treatment program. Realistically, there could be a myriad of factors related to the TEE sessions that could have helped to soften the effect of high levels of ambivalence, and perhaps it was a cumulative effect of the entirety of the TEE sessions. The TEE sessions (and MI therapy in general) involves the interplay of a variety of directive techniques, along with a specific relational style and relies on the openness and engagement of the client. One explanation that coincides with the results of Chapter Six may be that it is the combination of skills, style, and client that matters. In Chapter Six, condition moderated the effect of therapist MICO behaviors on outcome, such that higher levels of

MICO were related to better outcome for MI but worse for SC, perhaps this finding demonstrates that in the context of MI where there is an emphasis on collaboration, autonomy, and evocation, MICO behaviors are helpful. Or in terms of ambivalence, higher levels are perhaps not so detrimental.

Taken together, another implication of the findings is that perhaps elements of the MI process relevant for substance users may be influencing treatment outcome for anxious clients via other treatment/client factors. And perhaps a more general implication is that underlying client factors might help to explain why there are disparities in the relationship between therapist/style and client language and outcome in other treatment domains even in the presence of similar methodologies. For example, some studies show that CT is related to better outcome, and others, like Chapter Six in this thesis, find no relationship between CT and outcome. Similarly, some studies highlight the effects of the relational therapist style, and others the effect of specific therapeutic techniques. The focus on CT as an active ingredient for example, raises the question of whether it is CT itself that is useful or whether CT is a marker of some underlying variable, such as increasing self-efficacy (Moyers, 2014). The same could be said for all of the therapist behaviors, and the interaction between these behaviors during MI, and whether it is the interplay of these behaviors or their effect on an underlying factor that is relevant to treatment outcome.

Implications for MI in the treatment of SAD

The current findings have implications for how MI would best be incorporated into treatment for SAD. The following suggestions arise out of the specific findings of the empirical papers and also the nature of using MI for socially anxious clients in an effort to enhance engagement. In the empirical papers, an MI-style preparatory treatment was used to enhance client expectation and motivation for the CBT group program. However, findings

from Chapter Four suggested that preparatory TEE prior to CBT for social anxiety did not decrease self-reported levels of ambivalence. On the contrary, findings from Chapter Six demonstrated that there was significantly more CT and CCT in TEE sessions than in SC sessions. Thus, the question remains as to whether discussing reasons for and against change in this context has the power to decrease ambivalence and whether ambivalence as measured by self-report or as captured by CCT utterances are analogous for clients with social anxiety.

The ability of the TEE sessions to augment ambivalence may come down to study methodology, the techniques used to discuss change during TEE sessions, the nature of the sample, or an interplay of all three. In addressing the first point, the difference between using MI in the context of a treatment trial as compared to a more naturalistic setting is that, in the current trial, individuals received three TEE sessions no matter whether they felt “ready” or not to begin the CBT component. Three sessions may not have been enough to completely resolve ambivalence and work through and consolidate all reasons to change or not change. Furthermore, three sessions may not have provided enough time to fully engage the client in the TEE process. Engagement with the preparatory treatment may also be affected by the nature of social anxiety. Because one of the main areas of concern for individuals with social anxiety is fear of judgment by others, clients often approach the individual sessions with a great deal of anxiety and it may take longer for TEE therapists to engage the client with the TEE program. Furthermore, because the TEE sessions focus on discussing the process of change, therapists do not provide clients with any CBT techniques to help them manage their anxiety in this setting. Therefore, it is probably quite difficult for socially anxious clients to even discuss their reasons for change, and alongside this, they are probably feeling very distressed during the TEE sessions, adding to feelings of ambivalence. This idea may be supported by findings from Chapter Four, which showed ambivalence actually increased over the pre-treatment period. Clinically, it might then be important to tailor MI to suit both the level of anxiety and ambivalence of the client. Perhaps for some clients, providing some

anxiety management techniques via CBT would be appropriate prior to addressing ambivalence via MI.

Another issue that may be important to consider in this context is the role of decisional balance methodology. During the TEE sessions, clients examined the costs and benefits of changing, however Miller and Rose (2013) suggest that using decisional balance may not be a beneficial technique to enhance motivation for change in ambivalent people. Miller and Rose also highlight that there is no evidence to suggest that using decisional balance methodology helps people to reach a decision to change, however if a person is already committed to the behavior change goal, examining the pros and cons of change may increase goal commitment. Given these findings, the use of decisional balance within the current treatment trial may have been better placed depending on the clients level of initial ambivalence and may have affected the ability of the TEE sessions to decrease ambivalence. Furthermore, findings from Chapter Five and Chapter Six did indicate that specific therapist behaviors and style were related to the elicitation of change language but at this point we cannot be sure that more expression of change language for socially anxious clients is actually helpful in terms of treatment outcome, or whether the discussion of reasons for and against change in fact helps to resolve ambivalence,

Given that Chapter Three found that levels of motivation were linked to treatment outcome for one anxiety study, and baseline levels of ambivalence were linked to treatment outcome in Chapter Five, motivational constructs appear to be worth pursuing as potential predictors of treatment outcome. Also, ambivalence in socially anxious clients might be a client factor to focus on in treatment for SAD more generally, whether or not MI is involved. The findings of Chapter Four demonstrated CBT-task related ambivalence was positively related to social anxiety symptoms each week, with a particularly difficult task showing a stronger relationship with anxiety ratings in following weeks. This finding not only suggests that it may be important to measure client ambivalence during CBT but also that perhaps an

MI style and techniques would be beneficial to incorporate throughout the CBT program. Though MI did not decrease baseline ambivalence in the current study, it did appear to moderate the effect of high levels of ambivalence on outcome, so perhaps it would also be beneficial for CBT-Task related ambivalence. One reason why MI may be better placed throughout CBT is that clients will be better equipped with strategies to deal with their social anxiety symptoms and may feel more comfortable discussing ambivalence. Furthermore, as the client progresses through the CBT program, ambivalence will wax and wane, with clients likely to feel more ambivalent when they encounter CBT strategies that will cause them distress. Given higher task-related ambivalence was associated with greater anxiety in Chapter Four, it might be more beneficial for MI techniques to be used at this stage of treatment to help encourage the client to partake in difficult treatment exercises. Here, MI Spirit and less directive CBT strategies may be better placed in order to facilitate a discussion of why the client wants to change and what is stopping them. In using an MI-consistent style in moments of ambivalence perhaps future ambivalence will be reduced, as demonstrated in a study examining client resistance (Aviram et al., 2016). Furthermore, change language at these difficult moments or throughout CBT specifically may be more relevant. Clients might become more aware of their reasons to change or not change in the face of difficult tasks, and this language might be more relevant to predicting outcome.

Limitations of the current thesis and future research directions

The overall aim of the current thesis was to examine MI processes in the context of anxiety disorders, and specifically in a population diagnosed with SAD. Overall, the results demonstrated that proposed MI mechanisms may provide an avenue for understanding the effect of MI in the treatment of SAD. However, given that this is the first program of research

to investigate MI processes in the context of SAD, future research is needed to replicate the current findings.

Chapter Two and Three examined the current state of evidence regarding the MI causal model and also MI mechanisms in the treatment of a wide range of mental health problems. One limitation specific to Chapter Two is the essentially qualitative nature of the review. A further limitation of both reviews is that though the selection criteria sought studies of MI treatment, there was limited use of treatment integrity measures to assess the quality of MI conducted in the reviewed studies, thus the findings may not be attributed to the presence of MI specifically. Rigorous use of MI treatment integrity measures or behavior-rating scales are needed in order to assess the process of MI therapy more adequately. A related point corresponding to the empirical papers in Chapters Four, Five, and Six, is that TEE therapists did not achieve proficiency standards for all Motivational Interviewing Treatment Integrity (MITI; Moyers, Martin, Manuel, Miller, & Ernst) standards, which may call the fidelity of the MI into question. However, the training provided in the larger randomized controlled trial was designed to mimic MI training that might be used in general clinical practice, and it is promising that similar relationships between therapist and client were found and are comparable to studies that have employed more experienced MI therapists. Also, while the TEE program incorporated MI principles it had an additional aim of specifically enhancing expectations of CBT treatment thus the pre-treatment itself differs from one that is purely based in MI.

In line with the aforementioned limitation, though the empirical papers investigated the effects of important elements of the MI process, namely the MI causal model and client ambivalence, there are many other factors thought to contribute to the efficacy of MI that were not accounted for. Both therapist and client factors could be further examined, for example, client engagement behaviors, whether it is self-exploration during MI sessions, or homework compliance and resistance during CBT. Additional therapist behaviors could also

be examined, including therapist empathy, and perhaps the extent to which MI relational components interact with specific therapist behaviors to predict client language and outcome. Furthermore, the empirical papers did not have enough power to examine individual behavior categories, such as categories of client language or specific therapist behaviors. There might be a role for certain types of language, for example commitment language, or strength of CT utterances as predictors of treatment outcome in this context. Also, the effect of specific therapist behaviors such as valenced reflections on outcome should be explored.

A further limitation is the essentially correlational nature of the research and inability to conduct mediational analyses. In order to better understand the process of MI, experimental research that manipulates therapist and client responses in an MI context is warranted to establish a causal relationship. Employing experimental methodologies may help to shed light on the aspects of MI most relevant to the treatment of SAD, and perhaps to the process of MI more generally.

A final limitation of the thesis is that it focused on the process of MI in the treatment of anxiety disorders. While the thesis adds to the breadth of knowledge about the process of MI in general and in the context of SAD specifically, examining the underlying mechanisms of MI could potentially inform process research in diverse therapeutic modalities. The relationship between potential mediators of treatment effectiveness and client outcome is elusive in all forms of psychotherapy. Systematically observing the relationship between therapist and client behaviors in a variety of therapy styles may indicate the types of behaviors that are fundamental to psychotherapy process in general, potentially allowing for enhanced client outcome.

Conclusion

The current thesis represents the first examination of MI process variables in an MI-style treatment for SAD. Given that MI is beginning to demonstrate positive effects in terms

of engagement and treatment outcome in the realm of anxiety disorders, there is a need to investigate the process through which MI generates such effects. In doing so, we may be able to identify best practice for MI in the treatment of anxiety disorders. The research findings from the current thesis, taken together, support the proposal that MI mechanisms and treatment ingredients may be important to examine in the context of treatment for anxiety disorders, as well as partly being implicated in the treatment outcome of socially anxious individuals, specifically.

References

- Apodaca, T. R., Jackson, K. M., Borsari, B., Magill, M., Longabaugh, R., Mastroleo, N. R., & Barnett, N. P. (2016). Which individual therapist behaviors elicit client change talk and sustain talk in motivational interviewing. *Journal of Substance Abuse Treatment, 61*, 60 – 65.
doi: 10.1016/j.jsat.2015.09.001
- Apodaca, T. R., & Longabaugh, R. (2009). Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction, 104*, 705–715.
doi:10.1111/j.1360-0443.2009.02527.x
- Arkowitz, H., Miller, W. R., & Rollnick, S. (Eds.). (2015). *Motivational interviewing in the treatment of psychological problems*. (2nd ed.). New York: Guilford Press.
- Arkowitz, H., Westra, H. A., Miller, W. R., & Rollnick, S. (Eds.). (2008). *Motivational interviewing in the treatment of psychological problems*. New York: Guilford Press.
- Aviram, A., & Westra, H. A. (2011). The impact of motivational interviewing on resistance in cognitive behavioral therapy for generalized anxiety disorder. *Psychotherapy Research, 21*, 698–708. doi:10.1080/10503307.2011.610832
- Aviram, A., Westra, H. A., Constantino, M. J., & Antony, M. M. (2016). Responsive management of early resistance in cognitive-behavioral therapy for generalized anxiety disorder. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000100
- Barnett, E., Spruijt-Metz, D., Moyers, T. B., Smith, C., Rohrbach, L. A., Sun, P., Sussman, S. (2014). Bidirectional relationships between client and counselor speech: The importance of reframing. *Psychology of Addictive Behaviors*. Advance online publication. doi: 10.1037/a0036227
- Bertholet, N., Palfai, T., Gaume, J., Daeppen, J.B., & Richard, S. (2014). Do brief alcohol

motivational interventions work like we think they do? *Alcoholism: Clinical and Experimental Research*, 38, 853 – 859. doi: 10.1111/acer.12274

Boardman, T., Catley, D., Grobe, J. E., Little, T. D., & Ahluwalia, J. S. (2006). Using motivational interviewing with smokers: Do therapist behaviors relate to engagement and therapeutic alliance? *Journal of Substance Abuse Treatment*, 31, 329–339. doi:10.1016/j.jsat.2006.05.006

Borsari, B., Apodaca, T. R., Jackson, K. M., Mastroleo, N. R., Magill, M., Barnett, N. P., & Carey, K. B. (2014). In-session processes of brief motivational interventions in two trials with mandated college students. *Journal of Consulting and Clinical Psychology*, Advance Online Publication. doi: 10.1037/a0037635

Brody, A. E., Arkowitz, B. A., & Allen, J. J. B. (2008). *Development and validation of a self-report measure of ambivalence towards change*. Poster presented at the annual meeting of the Association for Psychological Science, Chicago.

Button, M. L., Westra, H. A., Constantino, M. J., & Antony, M. M. (2015). *Client motivation as a moderator of treatment outcomes in MI-CBT for generalized anxiety*. In H. A. Westra and M. J. Constantino (Moderators), *An allegiance controlled RCT of MI-CBT for generalized anxiety*. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.

Catley, D., Harris, K. J., Mayo, M. S., Hall, S., Okuyemi, K. S., Boardman, T., & Ahluwalia, J. S. (2006). Adherence to principles of motivational interviewing and client within-session behavior. *Behavioral and Cognitive Psychotherapy*, 34, 43–56. doi:10.1017/S1352465805002432

Constantino, M. J., Westra, H. A., & Antony M. M (2015). *Mediators of treatment effects in a randomized controlled trial testing the efficacy of augmenting CBT with motivational interviewing for severe generalized anxiety disorder*. In H. A. Westra and M. J. Constantino

(Moderators), An allegiance controlled RCT of MI-CBT for generalized anxiety. Symposium presented at the 46th Annual Meeting of the Society for Psychotherapy Research, Philadelphia, USA.

Copeland, L., McNamara, R., Kelson, M., & Simpson, S. (2015). Mechanisms of change within motivational interviewing in relation to health behaviors outcomes: A systematic review.

Patient Education and Counseling, 98, 401-411. doi:10.1016/j.pec.2014.11.022

Crits-Christoph, P., Gallop, R., Temes, C. M., Woody, G., Ball, S. A., Martino, S., & Carroll, K. M. (2009). The alliance in motivational enhancement therapy and counseling as usual for substance use problems. *Journal of Consulting and Clinical Psychology*, 77, 1125–1135. doi:10.1037/a0017045

D’Amico, E.J., Houck, J.M., Hunter, S.B., Miles, J.N.V., Osilla, K.C., Ewing, B.A. (2014). Group motivational interviewing for adolescents: Change talk and alcohol and drug outcomes. *Journal of Consulting and Clinical Psychology*, 83, 68–80. Advance online publication. <http://dx.doi.org/10.1037/a0038155>

Gaume, J., Bertholet, N., Faouzi, M., Gmel, G., & Daeppen, J.B. (2010). Counselor motivational interviewing skills and young adult change talk articulation during brief motivational interventions. *Journal of Substance Abuse Treatment*, 39, 272–281. doi:10.1016/j.jsat.2010.06.010

Gaume, J., Gmel, G., Faouzi, M., & Daeppen, J.B. (2008). Counselor behaviors and patient language during brief motivational interventions: a sequential analysis of speech. *Addiction*, 103, 1793 - 1800. doi: 10.1111/j.1360-0443.2008.02337.x

Gaume, J., Magill, M., Longabaugh, R., Bertholet, N., Gmel, G., & Daeppen, J. B. (2014). Influence of counselor characteristics and behaviors on the efficacy of a brief motivational intervention for heavy drinking in young men – A randomized controlled trial. *Alcoholism:*

- Houck, J., Moyers, T. B., Miller, W. R., Glynn, L., & Hallgren, K. (2013). *Motivational Interviewing Skill Code 2.5*. Retrieved from <http://casaa.unm.edu/download/misc25.pdf>
- Lombardi, D. R., Button, M. L., Westra, H. A. (2014). Measuring motivation: Change talk and counter-change talk in cognitive behavioral therapy for generalized anxiety. *Cognitive Behavior Therapy*, 43, 12-21. doi: 10.1080/16506073.2013.846400
- Miller, W. R., Benefield, R. G., & Tonigan, J. S. (1993). Enhancing motivation for change in problem drinking: A controlled comparison of two therapist styles. *Journal of Consulting and Clinical Psychology*, 61, 455–461. doi:10.1037/ 0022-006X.61.3.455
- Miller, W. R., & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behavior*. New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change* (2nd ed.). New York: Guilford Press.
- Miller, W. R., & Rollnick, S. (2013). *Motivational interviewing: Helping people change* (3rd ed.). New York: Guilford Press.
- Miller, W. R., & Rose, G. S. (2009). Toward a theory of motivational interviewing. *American Psychologist*, 64, 527–537. doi:10.1037/ a0016830
- Miller, W. R., & Rose, G. S. (2015). Motivational interviewing and decisional balance: Contrasting responses to client ambivalence. *Behavioral and Cognitive Psychotherapy*, 43, 129 – 141. doi:10.1017/S1352465813000878
- Moyers, T. B. (2011). Disseminating motivational interviewing in psychiatric and adolescent populations: Optimism and a few worries. *The Canadian Journal of Psychiatry*, 56, 641 – 642. doi: 10.1177/070674371105601101

- Moyers, T. B. (2014). The relationship in motivational interviewing. *Psychotherapy, 51*, 358-363.
doi:10.1037/a0036910
- Moyers, T. B., Martin, T., Houck, J. M., Christopher, P. J., & Tonigan, J. S. (2009). From In-session behaviors to drinking outcomes: A causal chain for motivational interviewing. *Journal of Consulting and Clinical Psychology, 77*, 1113–1124. doi:10.1037/a0017189.supp
- Moyers, T. B., Martin, T., Manuel, J. K., Miller, W. R., & Ernst, D. (2010). *Manual for the revised global scales: Motivational interviewing treatment integrity 3.1.1* (MITI 3.1.1). Retrieved from <http://casaa.unm.edu/download/miti3.pdf>
- Moyers, T. B., Miller, W. R., & Hendrickson, S. M. (2005). How does motivational interviewing work? Therapist interpersonal skill predicts client involvement within motivational interviewing sessions. *Journal of Consulting and Clinical Psychology, 73*, 590–598.
doi:10.1037/0022-006X.73.4.590
- Morgenstern, J., Kuerbis, A., Amrhein, P., Hail, L., Lynch, K., & McKay, J. R. (2012). Motivational interviewing: A pilot test of active ingredients and mechanisms of change. *Psychology of Addictive Behaviors, 26*, 859–869. doi:10.1037/a0029674
- Pirlott, A. G., Kisbu-Sakarya, Y., Defrancesco, C. A., Elliot, D. L., & Mackinnon, D. P. (2012). Mechanisms of motivational interviewing in health promotion: A Bayesian mediation analysis. *International Journal of Behavioral Nutrition and Physical Activity, 9*, 69.
doi:10.1186/1479-5868-9-69
- Rowa, K., Gifford, S., McCabe, R., Milosevic, I., Antony, M. M., & Purdon, C. (2014). Treatment fears in anxiety disorders: Development and validation of the treatment ambivalence questionnaire. *Journal of Clinical Psychology, 00*, 1-15. doi: 10.1002/jclp.22096
- Tetley, A., Jinks, M., Huband, N., & Howells, K. (2011). A systematic review of measures of therapeutic engagement in psychosocial and psychological treatment. *Journal of Clinical*

Psychology, 67, 927–941. doi:10.1002/jclp.20811

Westra, H. A., Arkowitz, H., & Dozois, D. J. (2009). Adding a motivational interviewing pretreatment to cognitive behavioral therapy for generalized anxiety disorder: A preliminary randomized controlled trial. *Journal of Anxiety Disorders*, 23, 1106–1117. doi: 10.1016/j.janxdis.2009.07.014

Westra, H. A., Constantino, M. J., & Antony M. M (2016). Integrating motivational interviewing with cognitive-behavioral therapy for severe generalized anxiety disorder: An allegiance-controlled randomized clinical trial. *Journal of Consulting and Clinical Psychology*. Advance Online Publication. doi: 10.1037/ccp0000098

Appendix

Copy of final ethics approval letter

From: Ethics Secretariat <ethics.secretariat@mq.edu.au>

To: Lorna Peters <lorna.peters@mq.edu.au>

Dear Dr Peters

Re: "Enhancing cognitive behavioural treatment outcomes for social phobia"

(Ethics Ref: 5201100907)

Thank you for your recent correspondence. Your response has addressed the issues raised by the Human Research Ethics Committee and you may now commence your research.

The following personnel are authorised to conduct this research:

A/Prof Andrew Baillie

Dr Lorna Peters

Prof Ron Rapee

NB. STUDENTS: IT IS YOUR RESPONSIBILITY TO KEEP A COPY OF THIS APPROVAL EMAIL TO SUBMIT WITH YOUR THESIS.

Please note the following standard requirements of approval:

1. The approval of this project is conditional upon your continuing compliance with the National Statement on Ethical Conduct in Human Research (2007).

2. Approval will be for a period of five (5) years subject to the provision of annual reports.

Your first progress report is due on 13 December 2012. If you complete the work earlier than you had planned you must submit a Final Report as soon as the work is completed. If the project has been discontinued or not commenced for any reason, you are also required to submit a Final Report for the project. Progress reports and Final Reports are available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

3. If the project has run for more than five (5) years you cannot renew approval for the project. You will need to complete and submit a Final Report and submit a new application for the project. (The five year limit on renewal of approvals allows the Committee to fully re-review research in an environment where legislation, guidelines and requirements are continually changing, for example, new child protection and privacy laws).

4. All amendments to the project must be reviewed and approved by the Committee before implementation. Please complete and submit a Request for Amendment Form available at the following website:

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/forms

5. Please notify the Committee immediately in the event of any adverse effects on participants or of any unforeseen events that affect the continued ethical acceptability of the project.

6. At all times you are responsible for the ethical conduct of your research in accordance with the guidelines established by the University. This information is available at the following websites: <http://www.mq.edu.au/policy/>

http://www.research.mq.edu.au/for/researchers/how_to_obtain_ethics_approval/human_research_ethics/policy

If you will be applying for or have applied for internal or external funding for the above project it is your responsibility to provide the Macquarie University's Research Grants Management Assistant with a copy of this email as soon as possible. Internal and External funding agencies will not be informed that you have final approval for your project and funds will not be released until the Research Grants Management Assistant has received a copy of this email.

If you need to provide a hard copy letter of Final Approval to an external organisation as evidence that you have Final Approval, please do not hesitate to contact the Ethics Secretariat at the address below.

Please retain a copy of this email as this is your official notification of final ethics approval.

Yours sincerely

Dr Karolyn White

Director of Research Ethics

Chair, Human Research Ethics Committee

From: Ethics Secretariat <ethics.secretariat@mq.edu.au>

Date: 21 December 2012 3:08:34 PM AEDT

To: Lorna Peters <lorna.peters@mq.edu.au>

Subject: Re: Amendment request: 5201100907

Dear Lorna

Thank you for your email and response. The following amendment has been approved:

1. The addition of questionnaire measures to assess motivational interviewing process

variables. Participants will complete an additional three questionnaires to measure client evaluation of motivational interviewing, client discrepancy and client ambivalence. Client evaluation of motivational interviewing will be measured once after the participants complete their TEE and Supportive counselling sessions. The discrepancy questionnaire will be measured before and after TEE/Supportive counselling. Two ambivalence measures will be measured before and after TEE/Supportive counselling. A second part of the questionnaire will be completed during CBT sessions.

2. The addition of Miss Mia Romano as a PhD student to the personnel on the project.

Please do not hesitate to contact me if you have any questions.

Regards

Fran