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Motivational Interviewing as an Augmentation to Increase Effectiveness in Cognitive

Processing Therapy for PTSD: An Initial Trial

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Abstract

Currently, even well-supported cognitive behavioral therapies to treat posttraumatic stress disorder (PTSD) suffer from consistent rates of dropout and non-response to treatment, which represent barriers to dissemination and effective treatment. Research in anxiety disorders, including an initial group-based study with veterans suffering from PTSD, suggests that Motivational Interviewing (MI) may be an effective intervention for addressing issues of ambivalence and increasing readiness to change (RTC), resulting in decreases in dropout and non-response. The present pilot study sought to assess the efficacy of augmenting Cognitive Processing Therapy (CPT) with 3 sessions of MI in a sample of female interpersonal assault survivors ($N = 17$). Within the MI study pilot sample, participants presented with a range in RTC) evidenced increases in RTC across the MI sessions ($F = 3.48, p = .053$), and demonstrated differential need for MI augmentation throughout the CPT sessions, as hypothesized. Moreover, no participants dropped out during the MI sessions, and participants noted that they found the MI sessions helpful and drew on the MI prep sessions to stay motivated during treatment. Contrary to hypotheses, MI did not significantly impact treatment expectations or fear of treatment. The pilot results were also compared to a concurrently conducted comparison CPT trial ($N = 92$) as well as to the broader PTSD outcomes literature. Interestingly, MI did not have a differential effect on RTC measures ($F = 1.86, p = .093$) as compared with the comparison study conditions. Comparison results also indicate that MI did not substantially improve dropout rates ($\chi^2 = .49, p = .782$) or treatment engagement measures ($F = 1.24, p = .290$), and that MI+CPT participants evidence similar symptom outcomes to the comparison trial ($F = .84, p = .541$).

Similarly, MI study rates were at the high end for dropout and evidenced equivalent treatment outcomes, as compared to recent CPT trials. Study limitations and clinical implications are considered.

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A. **Posttraumatic Stress Disorder Prevalence, Criteria, and Treatment**

Exposure to traumatic events is an unfortunately common occurrence with

significant consequences for survivors. Epidemiological study estimates that the majority

of individuals will experience at least one traumatic event in their lifetime. In a large-

scale study of cities in the southern United States, Norris (1992) found that 69% of

people had experienced at least one trauma in their lifetime. Similarly, in their nationally

representative sample of over 8,000 adults Kessler et al. (1995) reported that 61% of men

and 51% of women had experienced at least one traumatic event in their lifetime.

Moreover, survivors of trauma often experience significant, negative sequelae of the

event, including medical costs, occupational and other functional impairment, and

psychological burden (Kessler, 2000).

Post-traumatic stress disorder (PTSD) is the most common psychiatric diagnosis

following a trauma (Resick, 2001). According to diagnostic criteria set out in the

Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; APA,

2000), PTSD develops after the experience of a traumatic event, which involves threat to

life or integrity to self or others that is experienced with fear, helplessness, and/or horror.

PTSD is further defined by three clusters of symptoms: 1) re-experiencing symptoms,

including nightmares, flashbacks, and intrusive memories; 2) avoidance and numbing

symptoms, characterized by avoidance of trauma-related cues, emotional numbing, social

withdrawal, and restricting general activities; and 3) hyperarousal symptoms, marked by

features such as hypervigilance, anger and irritability, sleep impairment, and

concentration deficits. To meet clinical criteria, these symptoms must cause significant distress or impairment in functioning. Survivors with PTSD typically experience impairments across several major domains of functioning; thus treatment for this chronic condition is critically important in re-establishing functioning and regaining quality of life (Galovski, Sobel, Phipps & Resick, 2005).

Survivors of interpersonal trauma are at particularly high risk, and in fact, are more likely than the survivors of any other trauma type to develop PTSD (Kessler et al., 1995). Exposure to interpersonal trauma is a relatively common experience. In a survey of 2,200 participants conducted in the Detroit area, Breslau et al. (1998) found that the lifetime prevalence rate of interpersonal violence exposure was 38%. In a national sample of 4,008 women, 13% reported at least one completed rape, 14% reported an attempted rape or molestation, and 10% reported a serious physical assault. This study also found that 32% of rape survivors, 31% of sexual assault survivors, and 39% of physical assault survivors developed PTSD (Resnick, Kilpatrick, Dansky, Saunders, & Best, 1993).

Independent of the type of trauma, females appear to be at a higher overall risk of developing PTSD after a traumatic event. An epidemiological study estimates that 20% of women exposed to trauma developed PTSD, as compared to only 8% of men (Kessler et al., 1995). Additionally, a recent meta-analyses found that women were at higher risk for PTSD across every type of trauma (Tolin & Foa, 2006). Thus, it has been proposed that female survivors of interpersonal trauma make up the largest percentage of overall PTSD cases (Calhoun & Resick, 1993).

Fortunately, there now exist several well-supported psychotherapies for PTSD

(Foa, Keane, Friedman, & Cohen, 2009). Specifically, cognitive behavioral therapies (CBTs) have demonstrated strong empirical support and are the only group of therapies approved as empirically supported treatments for PTSD. As a group, these treatments are highly effective, with several recent meta-analyses finding consistent empirical supported for trauma-focused CBTs. In a meta-analysis of 26 randomized controlled trials (RCTs), Bradley et al. (2005) found that 67% of individuals who completed a trauma-focused CBT lost their PTSD diagnosis. Similarly, a meta-analysis of 38 RCTs supported trauma-focused CBTs as superior to waitlist (WL) and non-specific/supportive psychotherapies with equivalent results among different CBTs (Bisson et al., 2007). Overall, each of the trauma-focused CBTs provides survivors with equally effective therapeutic outcomes (Ehlers et al., 2010).

Cognitive processing therapy (CPT; Resick, Monson, & Chard, 2010) is one such CBT, which was initially developed to treat symptoms of PTSD and depression and first tested in a sample of female survivors of rape and sexual assault. CPT is primarily a cognitive therapy, which emphasizes cognitive techniques including Socratic questions to accurately integrate assault-related information with previously existing belief systems (Resick, Monson, & Rizvi, 2008). The therapist assists the survivor in resolving assimilated and over-accommodated thoughts, or stuck points, resulting from the trauma by collaborating with the patient in identifying and challenging the stuck points and developing more accurate and helpful alternate thoughts (Resick et al., 2010). When stuck points are resolved, *manufactured emotions* (caused by the inaccurate thoughts) necessarily disappear. CPT also includes a written narrative, in which clients write a narrative of their worst traumatic memory and are asked to review it both in session and

at home. The written narrative in CPT is thought to differ from exposure therapies in that

it relies on the assumption that the processing of *natural emotions* connected to the fear

structure allows these emotions to dissipate and is not believed to rely on habituation

(Cahill, Rothbaum, Resick, & Follette, 2009; Resick, Monson et al., 2008). Thus, CPT

results in the eventual resolution of both primary and secondary emotions connected to

the trauma.

CPT has been tested in seven RCTs with survivors of interpersonal assault and

military traumas, with comparable results to other trauma-focused CBTs. Resick et al.

(2002) initially compared CPT to prolonged exposure (PE), the leading PTSD treatment

at the time, and a minimal attention condition in a sample of 171 female rape survivors.

Results of this trial indicated that both active treatments produced large effects on PTSD

and depressive symptoms, which were maintained at a 9-month follow-up. The active

treatments did not significantly differ on tested outcomes, except that CPT demonstrated

superior outcomes compared to PE on a measure of trauma-related guilt at post-treatment

and 9-month follow-up and with respect to health-related concerns (Galovski, Monson,

Bruce, & Resick, 2009). Resick et al. (2008) then completed a dismantling study to

examine the effectiveness of the unique theorized components of CPT. The study

randomized 150 female survivors of interpersonal violence to receive 12 individual

therapy sessions of either original protocol CPT, CPT-C (no written narrative), or written

accounts only (WA). Results indicated that the treatment conditions were equally

effective in reducing PTSD and depressive symptoms, as well as anger, guilt, anxiety,

and shame at the end of treatment. However, the conditions differed during the course of

treatment, such that CPT-C participants reported a faster reduction in symptoms than the

WA participants.

Five other RCTs have been conducted to extend the literature regarding the flexibility and effectiveness of CPT. Chard (2005) compared the efficacy of a group format of CPT with a minimal attention condition for 71 female child sexual abuse (CSA) survivors. This study employed 17-weeks of group therapy coupled with 9-weeks of concurrent individual treatment for processing the written narrative. Results from this trial showed large effect sizes when CPT was compared with minimal attention on PTSD, depressive, and dissociative symptoms; these differences were maintained at 1-year follow up. However, this study uniformly extended treatment for CSA survivors, thus the necessity of the extended length of CPT was yet unknown. In an effort to test the flexibility of this robust protocol, Galovski and colleagues (2012) administered a variable length of CPT to male and female physical and sexual assault survivors, dependent upon individual treatment progress. This study found that the majority of survivors met good end-state criteria (including PTSD-negative status with low scores for PTSD and depression) prior to the end of the 12-session protocol and that treatment gains were maintained at 3-month follow-up regardless of the number of sessions necessary to meet good end-state functioning.

Monson and colleagues' (2006) extended analysis of CPT to military-related PTSD. Participants were 60 veterans (90% male; 80% Vietnam era), randomized to either 12 individual CPT sessions or to CPT following a 10-week WL. CPT was again superior to WL, with CPT participants evidencing large effect size changes on PTSD and general anxiety symptoms, as well as trauma-related guilt and global psychosocial functioning, with a trend for improvement on depressive symptoms in the CPT condition

as well. This result has been replicated in an Australian veteran sample, wherein CPT

was again superior to WL at post-treatment and follow-up (Forbes et al., 2012). Suris

and colleagues (2013) similarly found large effects of CPT on PTSD and depressive

symptoms within a sample of military sexual trauma survivors. Overall, results from this

successful empirical career indicate that CPT is as effective as other leading trauma-

focused CBTs in alleviating the symptoms of PTSD, as well as other concurrent clinical

concerns, and in increasing global psychosocial functioning. Moreover, CPT appears to

be effective when administered in both group and individual formats, with and without a

written narrative, for survivors of a range of traumatic experiences.

B. **Differential Responses to PTSD Interventions**

Although CBTs for PTSD, including CPT, have been shown to be effective in

producing statistically and clinically significant change for PTSD positive trauma

survivors, not all survivors benefit equally from the currently available treatments.

Clients who seek treatment for PTSD using CBTs experience a range of outcomes,

including successful therapeutic outcomes (i.e., the amelioration of PTSD symptoms and

increase in global functioning) in the majority of survivors, as well as non-optimal

responses, including premature dropout from treatment and non-response to treatment

(i.e., a lack of change in PTSD symptoms during treatment). All CBTs for PTSD have

some rate of dropout, ranging as high as 54%, but consistently 20% or above in the

majority of studies (Bradley et al., 2005; Imel, Laska, Jakupcak, & Simpson, 2013;

Schottenbauer, Glass, Arnkoff, Tendick, & Gray, 2008), as well as some percentage of

non-response to treatment, ranging as high as 50% in some studies, and averaging 33%

across studies (Bradley et al., 2005; Schottenbauer et al., 2008). In fact, dropout and non-response to treatment have been identified as two of the most critical barriers to the dissemination and effectiveness of these otherwise effective CBTs (Cahill & Foa, 2004).

Just as the range of current CBT treatments have similar effectiveness, the group as a whole also appears to suffer from some portion of non-optimal treatment responses. Reviews of trauma-focused CBTs have found no consistent differences in rates of dropout and non-response between therapy types (Ehlers et al., 2010; Hembree et al., 2003), indicating that attrition and non-response are issues universal to empirically supported CBTs for PTSD and are not unique to a particular mode of treatment. As such, a logical avenue to address issues of non-optimal response to PTSD treatment is through the identification of predictors of dropout and non-response.

Predictors of Differential Response

A review of the literature reveals multiple factors are associated with differential outcomes for PTSD following CBT, which could potentially be utilized to improve outcomes. First, several therapy process-related factors emerge as treatment response predictors. Low client ratings of treatment credibility predicted dropout (Taylor, 2004) and non-response to treatment (Tarrier, Sommerfield, Pilgrim, & Faragher, 2000), with the latter study also indicating low therapist ratings of client motivation as a predictor of non-response to treatment. Longer duration of therapy has been linked with poor response to treatment (Tarrier et al., 2000). Conversely, therapeutic alliance (Cloitre, Chase Stovall-McClough, Miranda, & Chemtob, 2004; Knaevelsrud & Maercker, 2007; Najavits, Weiss, Shaw, & Muenz, 1998) and homework compliance (Scott & Stradling, 1997) are largely associated with positive treatment outcomes. However, this literature is

not conclusive, with a separate study finding no differences between partial responding and full responding treatment completers on homework compliance, total session attendance, or therapist or group effects (Taylor et al., 2001). These results may differ due to methodological issues, as the latter study assessed only MVA survivors and analyzed differences between statistically derived clusters of treatment responders, as opposed to continuous PTSD outcomes.

Several facets of initial PTSD presentation also predicted dropout and non-response. More severe PTSD symptoms predicted dropout (Bryant et al., 2008; Chard, 2005; Foa, Rothbaum, Riggs, & Murdock, 1991; Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998) and non-response (Hembree, Street, Riggs, & Foa, 2004; Owens, Chard, & Cox, 2008; Taylor, 2003, 2004; van Minnen, Arntz, & Keijsers, 2002), with two studies relating higher avoidance symptoms to dropout (Bryant et al., 2007) and longer duration of PTSD symptoms to non-response to treatment (van Minnen et al., 2002). Some types of anger were associated with non-response to treatment (Foa, Riggs, Massie, & Yarczower, 1995; Forbes, Creamer, Hawthorne, Allen, & McHugh, 2003; Forbes et al., 2008; Pitman et al., 1991; Taylor et al., 2001), though these findings are quite mixed with many studies failing to replicate this result (Cahill, Rauch, Hembree, & Foa, 2003; Galovski, Elwood, Blain, & Resick, in preparation; Rizvi, Vogt, & Resick, 2009). A recent finding suggests that anger may interact with PTSD severity to predict treatment response (Owens et al., 2008), possibly explaining some of these conflicting results.

Other clinical features have also been linked to outcomes. Depressive symptoms (Bryant et al., 2008) and catastrophic thinking (Bryant et al., 2007) were associated with higher rates of dropout, but depression yielded very mixed results in predicting non-

response to treatment (Rizvi et al., 2009; Tarrier et al., 2000; Taylor et al., 2001).

However, several clinical correlates of PTSD and depression were cited as predictors of

non-response in individual studies, including higher suicidality (Tarrier et al., 2000),

hopeless cognitions (Owens et al., 2008), and a sense of alienation or permanent change

(Ehlers et al., 1998). Similarly, guilt and shame predicted non-response to treatment

(Owens et al., 2008; Pitman et al., 1991; van Minnen et al., 2002), but again support was

mixed (Rizvi et al., 2009; Taylor et al., 2001). Both GAD diagnosis (Tarrier et al., 2000)

and higher levels of pre-treatment anxiety (Hembree, Marshall, Fitzgibbons, & Foa,

2001) predicted non-response to treatment in a single study each, and higher pre-

treatment alcohol use predicted dropout (Riggs, Rukstalis, Volpicelli, Kalmanson, & Foa,

2003; van Minnen et al., 2002). Each of these predictors illuminates a potential area for

enhancing treatment results.

The Role of Ambivalence in PTSD

Ambivalence is an important consideration in the outcomes of PTSD treatments

and is a notorious factor presenting clinical challenges in PTSD work (Resick, Monson et

al., 2008). Unfortunately, this important factor has been relatively neglected in the PTSD

literature. Moreover, researchers vary in their use of this clinical term, and the specific

connection between ambivalence and PTSD-related constructs has not been well defined.

In their comprehensive review of the discussion of ambivalence across psychotherapy

literatures, Engle and Arkowitz (2006) define ambivalence as "movements toward

change as well as movements away from change" (p. 3). Westra and Dozois (2008)

utilize a similar definition in their discussion of ambivalence in anxiety disorders, "one

wants change, yet one resists change simultaneously," (p. 30). Thus, ambivalence is

defined both in terms of behaviors that become apparent in therapy and an underlying internal process. In both definitions, the authors concur that ambivalence may be about the change itself or about the methods of change (process), and may take many forms (behaviors), including not coming to sessions, not completing out of session practice, or not fully engaging while in session (Engle & Arkowitz, 2006; Newman, 2002). Interestingly, these ambivalent behaviors closely match several of the process factors found to predict differential outcomes for trauma focused CBTs.

Within PTSD specifically, Resick and colleagues (2008) note that ambivalence about therapy may stem from wanting help, while simultaneously grappling with issues around trust, shame, trauma-related fear, and PTSD-driven avoidance of trauma-related stimuli (e.g., discussions of the traumatic experience in therapy), the balance of which leads to ambivalent behavior. Thus, Resick et al. note specific PTSD related clinical features (e.g., avoidance and trust concerns) that may contribute to clients' internal ambivalence process (i.e., wanting and not wanting change, above) and produce behaviors indicative of ambivalence (e.g., including not coming to sessions, not completing out of session practice, or not fully engaging while in session, above). This ambivalence framework can be expanded to address the negative PTSD treatment outcomes predictors reviewed above.

The role of ambivalence can be seen in the symptom-related factors that predict non-optimal response. Specifically, as Resick et al. (2008) allude to in their work, many of the symptoms and related features of PTSD contribute to distress, that causes clients to want change, but also produce factors making engagement in the change process difficult. For example, higher PTSD symptoms indicate higher levels of PTSD-driven avoidance,

which may increase ambivalence around discussing the trauma in therapy. Similarly, alcohol use has been linked as an avoidant coping strategy (Ullman, Filipas, Townsend, & Starzynski, 2005), possibly indicating decreased readiness to change (RTC) and higher ambivalence about change. Anger, guilt, and shame have also been discussed as creating barriers to treatment engagement through defensive blocking, mistrust, and increased avoidance of trauma-related topics (Forbes et al., 2008; Resick, Monson et al., 2008). Likewise, clients with hopeless or catastrophizing cognitive styles or those who perceive a sense of permanent damage may believe that therapy may not work for them, that they cannot meet the demands of treatment, or that they are too damaged to be helped (Bryant et al., 2007; Ehlers et al., 1998); they may understandably have less motivation for change and experience more ambivalence. Each of these PTSD related features could contribute to 'movements away from change,' thus contributing to the ambivalence process and behaviors.

The process factors reviewed may also indicate a role for ambivalence in predictors of non-optimal PTSD treatment outcomes. As was noted in the larger literature, the internal process of ambivalence may be evident in multiple behaviors throughout the therapy process, such as therapy attendance and overall engagement (Engle & Arkowitz, 2006; Newman, 2002). Similar behaviors have been noted as predictors of poor outcome in PTSD, though they have not been discussed specifically as ambivalence. For example, Tarrier and colleagues (2000) noted that longer duration of therapy, more missed sessions, and longer length between sessions may be "proxy markers which reflect a patient's avoidance of therapy through irregular attendance," (p. 199). One could further conclude that these behaviors of engaging partially in treatment

mark a desire both to engage and to avoid, or an ambivalent approach. It is also likely that lower perceived treatment credibility and patient motivation may be early markers of ambivalence toward treatment as perceived by the client and therapist, such that ambivalent clients might be more skeptical of the treatment and therapists might see ambivalence as low motivation. Not surprisingly then, higher alliance ratings, consistent attendance, and out of session practice of therapy skills, which may indicate lower ambivalence and avoidance, are largely linked to better treatment outcomes.

In sum, the predictors of non-optimal treatment responses in PTSD may be connected to ambivalence processes in important ways. PTSD clinical features (PTSD symptom severity and avoidance symptoms, anger, depressive symptoms, suicidality, catastrophic thinking, hopeless cognitions, a sense of alienation or permanent change, guilt, shame, general anxiety, and alcohol use) may contribute to the internal ambivalence process, or the simultaneous wanting and resisting of change, by creating distress and a desire to change as well as factors producing fear of change or treatment, disbelief that treatment will work, etc. Similarly, process variables discussed in PTSD treatment outcomes (low treatment credibility, low motivation, inconsistent attendance, and reporting of logistic barriers) may serve as markers of the ambivalence process and indictors of a need to target RTC. Conversely, higher alliance ratings, consistent attendance, and out of session practice of therapy skills are behaviors that may indicate lower ambivalence toward the therapy process. These predictors of differential treatment responses to CBTs for PTSD represent important clinical targets and avenues for potential treatment enhancement.

C. Motivational Interviewing

MI is a therapeutic approach that specifically targets client ambivalence, decreases attrition, and increases therapeutic engagement (Hettema, Steele, & Miller, 2005). This intervention was developed by Miller and Rollnick (1991; 2002) and initially showed promise in producing change among substance using populations. Over the course of the last few decades, MI has been successful in increasing treatment response in a range of clinical presentations, including substance use disorders, eating disorders, several anxiety disorders, and depression (Arkowitz, Westra, Miller, & Rollnick, 2008; Federici, Rowa, & Antony, 2010). Importantly, however, MI's focus is on producing change in clients' readiness and motivation to change, and not on change in a specific problem area per se. As such, MI may provide an alternative conceptualization and novel treatment approach to address factors contributing to ambivalence that lead to suboptimal treatment responses in CBT for PTSD.

MI is a unique therapeutic approach that combines a client centered and directive therapeutic style. Built upon the Rogerian, person-centered approach, MI seeks to enhance clients' own motivation for change by resolving ambivalence (Arkowitz & Miller, 2008). The MI spirit is described as collaborative, not authoritarian; evocative, not installing/prescriptive; and honoring client autonomy (Rollnick & Miller, 1995). Using this therapeutic spirit as a foundation, four specific principles are employed to achieve change in intrinsic motivation: express empathy, develop discrepancy, roll with resistance, and support self-efficacy. The first principle, expressing empathy, is critical to the client centered, collaborative relationship, as well as to the change process. Here the therapist seeks to understand clients' views of their world and problem areas,

allowing the therapist to understand clients' motivations both for and against change.

Once this understanding is established, the therapist is able to begin developing

discrepancy. This principle rests on the assumption that individuals experience

discomfort when their behaviors and values are not congruent with one another. Thus,

the therapist seeks to reflect discrepancies and to elicit *change talk,* or arguments for

change, from clients. Conversely, resistance to change is also seen as natural part of the

change process from the MI stance. As such, arguments against change, or *sustain talk*,

are accepted with empathy and understanding. In this way, the therapist is able to roll

with resistance, express empathy, and align with clients, rather than providing judgment

that could amplify client ambivalence. Finally, the therapist seeks to support clients'

self-efficacy for change, thus eliciting and confirming both clients' internal motivation

for change and their belief in their ability to make desired changes, with the goal of

eliciting increasing verbal *commitment to behavior change* from the client.

　　　　As noted, MI has been efficaciously applied to a broad range of clinical

presentations and concerns. The majority of studies to date have focused on substance-

related disorders, eating disorders, and health behaviors (Hettema et al., 2005; Lundahl,

Kunz, Brownell, Tollefson, & Burke, 2010). Initial support for several other areas of

psychiatric concern, including anxiety and depressive disorders, has recently emerged

(Arkowitz et al., 2008). However, MI-based intervention has only been applied to

motivation to change PTSD in two initial studies (Murphy, Cameron et al., 2004;

Murphy, Thompson, Murray, Rainey, & Uddo, 2009). As such, a discussion of the

potential efficacy of MI for PTSD must draw from the larger MI literature to inform

potential PTSD interventions.

Several general conclusions can be drawn regarding MI's effectiveness across areas of treatment studied thus far. In their meta-analytic review of 72 studies, Hettema and colleagues (2005) noted large effect sizes for increased treatment engagement, retention, and adherence when MI was added as a precursor to treatment protocols, which the authors conclude is at least partially mediated by the effects of MI on increasing treatment adherence and treatment retention. Additionally, these authors note that MI's effects appear to be more lasting when paired with an active treatment then when used alone. In a subsequent review, Lundahl and colleagues (2009) found that MI appears to be equally effective for individuals at all levels of distress (across all reviewed problems areas). In contrast, research within the area of anxiety treatment with MI has found more benefit from MI among those with higher initial symptom severity (Westra & Dozois, 2008). Additionally, Lundahl et al. noted that MI provided in an individual format was more effective than group formats and proposed that this may be related to therapeutic alliance being central mechanism of change in MI. Finally, in a review of 19 MI studies, the use of a decisional balance exercise, in which the client weighs the pros and cons of changing, was the only specific technique to predict better outcomes (Apodaca & Longabaugh, 2009). In sum, it appears that MI is well supported across a range of problem areas, but that the specific format of the treatment may impact the effectiveness of the outcomes.

Transtheoretical Model

Although independently developed, MI overlaps in meaningful ways with Prochaska and colleagues' (2002; 2010) transtheoretical model (TTM). Both theories hold that: 1) change is a process, 2) individuals approach the change process with

differing levels of readiness, and 3) ambivalence is a natural part of the change process.

The stages of change (SOC) extend upon these general premises and posit that there are

six specific, non-linear stages of the change process: pre-contemplation, contemplation,

preparation, action, maintenance, and termination (Prochaska & Norcross, 2002).

Individuals in pre-contemplation do not intend to change and may not see that they have

a problem. In contemplation, the individual is aware of the problem and may be

considering change, but is not committed to change. During preparation, the individual is

aware of the problem and is planning to make change in the near future. Not

surprisingly, in the action stage the individual engages in behavior change. The

maintenance phase involves the consolidation of gains and preparation for maintenance

of gains and prevention of relapse. Finally, the termination stage involves the completion

of the change process, in which the individual no longer needs to work to prevent relapse.

Previous research has used the SOC, or RTC, to operationalize the change process and to

understand the impact of client SOC on the therapeutic process. This use of the SOC has

also been applied to evaluate the efficacy of MI.

The TTM also outlines several other interwoven components designed to support

a more complex and comprehensive understanding of the transcendent factor of

individual psychotherapy models. One central aspect of the larger model is the pros and

cons of changing, or decisional balance. The pros and cons of change are a natural

decisional balance used by individuals in considering change. This aspect of the model

highlights the need to assess both positive and negative aspects of change, reminiscent of

a decisional balance used in MI. The TTM posits that the pros of changing increase and

cons decrease as the individual progresses through the SOC.

A note on terms. Several terms are used inconsistently throughout these literatures to discuss issues related to motivation, ambivalence, and the change process, making accurate conceptualization and measurement of these constructs a challenge at present. As already noted, stages of change (SOC) and readiness to change (RTC) are used interchangeably to describe an individual's place in the change process. The term motivation for change is also used in this way; however, the larger literature ascribes unique elements to motivation *per se*. Indeed, DiClemente and Velasquez (2002) describe motivation as "what provides the impetus for the focus, effort, and energy needed to move through the entire process of change," (p. 202). So, although ambivalence is often thought of as a lack of motivation, it can more accurately be thought of as motivation for more than one action simultaneously (Miller & Rollnick, 2002). Thus the goal of MI is to build motivation for change (or increase the pros of change) versus the status quo (or the cons of change), thereby reducing ambivalence. As such, SOC/RTC are related to, but not interchangeable with, motivation and ambivalence; however, their measurement is often used as an indicator of ambivalence. Theoretically, ambivalence should be manifest when individuals are in lower stages of change (e.g., pre-contemplation and contemplation) and resolve as individuals prepare and take action. Conversely, motivation for change should build as one resolves ambivalence and moves toward the desired change.

D. Initial Research Investigating the Effectiveness of MI for PTSD

As discussed above, MI has demonstrated empirical success in preparing individuals with a variety of mental health concerns for change (Arkowitz & Burke,

2008; Hettema et al., 2005; Lundahl & Burke, 2009). However, research using MI as a complement to trauma-focused PTSD therapies is limited. Only two studies have examined the utility of an MI-based protocol for PTSD. A single other study, and a subsequent re-analysis, investigated the applicability of the TTM to the change process within PTSD.

Murphy and colleagues developed the motivation enhancement (ME) protocol for veterans using MI techniques and rationale to help veterans identify problems they might want to change and issues that may be getting the way of their change process (Murphy & Rosen, 2006). The ME protocol consists of four, 90-minute sessions comprising four steps: psychoeducation, comparison to the average guy, a pros and cons decisional balance, and roadblocks identification. The protocol uses these stages to examine a host of concerns the veteran has listed as *might haves, definitely haves,* or *definitely don't haves* (e.g., social withdrawal, nightmares, etc.), with the goal of identifying problems the veteran does have and would like to change in subsequent treatment. In an initial study of 243 participants examining the utility of ME, Murphy and colleagues (Murphy, 2008; Murphy, Cameron, Sharp, & Ramirez, 1999; Murphy, Cameron et al., 2004; Murphy, Rosen, Thompson, Murray, & Rainey, 2004; Murphy & Rosen, 2006; Murphy, Rosen, Cameron, & Thompson, 2002) found that participants reclassified 40% of the problems initially listed as *might haves* to *definitely haves* or *definitely don't haves*, with a majority of PTSD-related problems being reclassified to *definitely haves*. The authors conclude that these changes indicate an amelioration of ambivalence toward these problem areas.

As a second phase to their research, the Murphy group assessed the utility of the ME protocol as a preparation for a comprehensive outpatient PTSD program (Murphy et

al., 2009). In this study, 115 veterans were randomly assigned to 4 sessions of psychoeducation or PTSD motivational enhancement (PME) beginning in their second month of a 12-month multi-focus treatment program. The investigators aimed to assess group differences in attrition, session attendance, problem recognition, consideration of change, and PTSD treatment relevance, hypothesizing that the PME group would perform better than the psychoeducation group in all areas. Assessments were conducted immediately prior to the first PME/psychoeducation session and immediately after the fourth session. Symptom changes following completion of the full treatment program were not reported.

Although the authors' ambitious hypotheses were not fully supported, results lend some initial evidence for the utility of MI in enhancing PTSD treatment outcomes. Specifically, the investigators reported that the PME group changed a significantly higher proportion of their *might have* problems to *definitely haves* and demonstrated changes on multiple treatment attitude items (3 out of 7 items; e.g., "I have to consider what people say to me when they give me feedback" and "Comparing myself to guys my age who don't have PTSD will be helpful", and not "I plan on getting more help for my problems"), increased their perception of treatment relevance (1 out of 5 items; e.g., "I am satisfied with this particular group" and not "This group relates to my particular problems"). PME participants also had higher program attendance and longer attendance of groups post intervention than the psychoeducaton group. As such, these results suggest that this program made initial steps in addressing some predictors of non-optimal treatment outcomes, specifically, increasing program attendance, treatment credibility, and attitudes toward treatment. Moreover, participants in PME appear to have better

recognition of their trauma-related problems, possibly increasing motivation to work on these areas in PTSD treatment. Contrary to expected results, RTC as measured by the University of Rhode Island Change Assessment (URICA; McConnaughy, Prochaska, & Velicer, 1983) did not differ between the two groups and several items on other measures also failed to reach significance in between group tests.

Although the studies conducted by the Murphy group represent important initial attempts to investigate the utility of MI for PTSD, there are several limitations to their work thus far. In their initial assessment study, the authors conclude that the reclassification of a *might have* problem indicates a resolution in ambivalence; however, the recognition of a problem does not indicate the resolution of ambivalence to change that problem. Further, in their 2009 intervention study, the psychoeducation and PME groups did not differ on RTC post-intervention. The authors describe this lack of findings as "perplexing," and posit "attentional, cognitive, and reading problems" and "trouble remembering specific instructions (especially during a lengthy assessment)" (pp. 274-275) as potential sources of error leading to this outcome. This explanation is unlikely to address this finding given that both groups underwent the same assessment procedures. It is noteworthy that the researchers measured RTC regarding two specific problems, as opposed to general trauma issues as has been employed by other authors (Hunt, Kyle, Coffey, Stasiewicz, & Schumacher, 2006), which may have impacted results.

Other methodological issues limit the generalizability of these initial results. First, although understandable in the context of a VA-based trial, the PME intervention was administered in the second month of a 12-month program, potentially missing many

earlier treatment dropouts. Moreover, post-treatment symptoms were not assessed to test for differences in symptom change for the MI versus psychoeducation groups. Furthermore, the aim of increasing retention for a 1-year program is not in line with evidence-based practice or generalizable to most other treatment settings. Overall, it is also noteworthy that these results are limited in generalizability to male veterans engaging in relatively long-term, group treatments. As such, this work is limited in its ability to provide empirical support for MI as an augmentation to CBT treatments for PTSD, especially for female trauma survivors or those attending short-term individual, trauma-focused PTSD interventions. However, these studies provide important initial support for the feasibility and utility of an MI based intervention as a precursor to trauma-focused treatment.

A separate group of researchers have examined the applicability of the TTM to PTSD-positive veterans. Rooney et al. (2005) measured SOC (categorical)/ RTC (continuous) using the URICA, as well as decisional balance an using unpublished measures, in a treatment sample of 53 PTSD-positive male veterans. All participants were enrolled in a preparation group (a 2-day program providing psychoeducation regarding PTSD, treatment options, and a general introduction to the SOC model) followed by 14 weeks of CBT treatment for 2 days per week. TTM constructs were assessed on the first day of the preparation program, 3 weeks into CBT, post-treatment, and at 3-month follow-up. Higher pre-treatment RTC predicted increased endorsement of pros of entering therapy and endorsement of the pros of therapy predicted engagement in treatment. Decreasing endorsement of the cons of engaging in therapy predicted increase in SOC over time. The authors note change in SOC across treatment and change

in RTC at follow-up, but these changes failed to reach significance in their sample.

The authors point to the lack of change in SOC/RTC over times as a major limitation to the applicability of the TTM model to PTSD. However, they report an extremely low retention rate and acknowledge that low power and few individuals in the pre-contemplation stage at the initial assessment may have contributed to the lack of findings. It is also possible that individuals who dropped out may have felt better and thus not felt the need to participate further, potentially masking an effect on SOC over time. Moreover, this work did not employ a MI-based intervention specifically targeted at changing SOC; thus null findings on this outcome may indicate an insufficient intervention. Overall, this work provides mixed support for the applicability of the TTM to a PTSD-positive sample, and raises questions as to the applicability of the TTM model to predict changes over time. However, the lack of expected findings in this study needs to be considered in the context of the limitations discussed.

In a later report using the same sample, the Rooney group (2007) used the continuous RTC to predict changes in PTSD outcomes at 3-month follow-up. Results of this study revealed that initial RTC predicted 3-month PTSD symptom severity even when controlling for pre-treatment PTSD symptom severity. Additionally, increases in a RTC predicted decreases in PTSD symptoms over time. These results suggest that a client's initial RTC may affect overall treatment outcomes, and that bolstering RTC with MI may improve PTSD symptom outcomes for clients. This secondary analysis provides stronger initial support for the ability of the TTM to predict PTSD treatment outcomes but needs replication.

As is evident from the paucity of studies reviewed, the applicability of the TTM

and MI to PTSD has only begun to be examined. Results to date are limited regarding

the utility of MI for PTSD but do indicate that MI may help survivors identify areas for

change, increase their attitudes regarding treatment, and have more consistent therapy

attendance. Similarly, results regarding the applicability of the TTM for PTSD are

mixed, but provide some support for the relevance of TTM constructs in PTSD. These

mixed findings produced thus far may be due, in part, to the limitations of the studies

themselves as well as a general lack of consensus regarding the measurement of MI-

related constructs. Moreover, the only studies that have utilized MI interventions for

PTSD have used group-focused MI protocols in VA settings to prepare individuals for

diffuse group-based PTSD-interventions alongside other treatments and lacked

assessment of symptom change following these interventions. Thus, given the current

state of the research, it is premature to draw conclusions regarding the efficacy of MI for

PTSD or the generalizability of MI or TTM-related findings to civilian samples. As such,

a review of MI in the treatment of other anxiety spectrum disorders is provided to

examine the ability of MI to address similar concerns in closely related samples.

Review of the Efficacy of MI for Anxiety Disorders

Recent years have seen a growth in the application of MI as a precursor to CBT

for a broader range of psychopathology, including several anxiety disorders (Arkowitz et

al., 2008). Initial studies across the anxiety disorders have used MI to attempt to decrease

dropout, increase treatment engagement and compliance, and reduce ambivalence around

change prior to CBT. Several recent studies across the anxiety disorder spectrum have

supported the use of MI as an effective prelude to traditional CBTs. In a study of 55

participants with mixed anxiety disorder diagnoses (45% panic disorder [PD], 31% social

phobia, and 24% GAD), three sessions of MI (MI+CBT) were compared to a

pretreatment WL (WL+CBT) (Westra & Dozois, 2006). In this study, the individually

administered MI intervention utilized each of the four principles of MI with a focus on

resolving ambivalence around changing anxiety problems and around specific treatment

procedures. Results revealed that MI+CBT participants reported increased expectancy of

treatment outcomes and reported greater CBT homework compliance and that a higher

proportion of MI+CBT participants met criteria as treatment responders than WL+CBT

clients. Additionally, there was a trend ($p = .08$) for lower dropout in the MI group (16%

for MI versus 37% for WL). These results suggest that MI may be an effective prelude to

CBT for anxiety disorders insofar as MI bolstered participants' engagement in treatment

as well as treatment credibility.

A related study of 67 mixed diagnosis anxiety clients expanded upon these results

by further assessing the relationship between proposed process and change variables

(Westra, Dozois, & Marcus, 2007). Analyses revealed that the relationship between

expectancy for change and anxiety treatment outcomes was mediated by homework

compliance and initial symptom change in a group of individuals receiving CBT for

GAD and PD, but not for social phobia. Specifically, this study found that, for

individuals with PD and GAD, expectancy for change predicted homework compliance,

which predicted initial symptom change, which in turn predicted overall treatment

response, suggesting a pathway of clinically significant change predictors. The finding

that initial symptom change predicted overall treatment response is interesting, and

highlights a possible role of initial change in maintaining motivation for treatment and

validating self-efficacy for change. Although this study did not specifically utilize MI, it

illuminates potential pathways for increasing therapeutic change that may be addressed by MI interventions.

Positive results have also been observed in a study of 76 participants with GAD assigned to MI+CBT or WL+CBT (Westra, Arkowitz, & Dozois, 2009). MI was again individually administered and followed the same manual as the Westra and Dozois (2006) study. In this trial the MI group reported significantly lower worry following pre-treatment and were more likely to meet criteria as treatment responders following CBT as compared to WL+CBT. Additionally, therapist rated homework compliance was higher in the MI group, which partially mediated treatment outcomes. Moreover, those with low internal motivation and those with high worry severity at baseline, both groups at increased risk of poorer treatment outcomes, appeared to receive particular benefit from the MI+CBT treatment, such that these variables partially moderated the treatment response to MI. This study provides additional support for the utility of MI as a prelude to CBT-based anxiety treatments and echoes previous findings that MI increases homework compliance and overall treatment outcomes. Consistent with the different therapeutic styles, clients rated therapists as more evocative and less directive and described themselves as more active participants in the therapeutic process when CBT was proceeded by MI than when it was preceded by WL. Clients also endorsed a symbiotic balance between MI and CBT and expressed that they gained more from CBT having prepared in MI (Kertes, Westra, Angus, & Marcus, 2010).

A final initial pilot trial of MI as a precursor to exposure and response prevention (ERP) lends support for the utility of MI as a preparatory strategy for clients with obsessive-compulsive disorder (OCD) as well. Specifically, in a 12 person randomized

pilot intervention, participants who received four sessions of a readiness intervention (RI) based on MI principles were significantly more likely to enter ERP and showed greater treatment gains in ERP than WL participants (Maltby & Tolin, 2005). The individually administered RI intervention was specifically focused on increasing entrance to treatment for treatment refusing clients and thus focused on ambivalence around treatment procedures as well as symptom change more generally. Dropout analyses from ERP were not possible due to the small sample size. However, following RI six of seven participants entered ERP, 50% of whom dropped out, compared to one of five participants who entered and completed ERP following WL. This result is taken as an important gain as all participants had initially refused treatment. A secondary finding of this trial was that SOC as measured by the URICA did not predict entrance into treatment within this group. In fact, the majority of participants were in the contemplation or action stages at baseline, despite having recently refused to enter ERP. It is unknown if the continuous RTC measure would have produced similar results. In this sample, only a reduction in the fear of treatment following MI predicted entrance into ERP. Although the RI intervention was focused more specifically on helping clients to begin ERP, some findings may generalize to other anxiety disorders. In particular, the finding that fear of treatment was reduced with RI may generalize to other anxiety disorder treatments, which inherently ask participants to decrease avoidance of a feared stimuli (e.g., discussing a trauma in PTSD treatment). Moreover, these findings suggests that for treatment refusers, and possibly for those with higher levels of fear of treatment in general, reduction of fear of treatment may play a larger role in decreasing ambivalence than increasing overall RTC.

Taken together, the above studies provide initial support for the ability of MI to target several important factors within anxiety disordered populations, including treatment engagement, treatment expectations, homework compliance, treatment retention, client ratings of therapist warmth, and enhancement of overall outcomes when paired with CBT for a range of anxiety disorders. Of note, the studies reviewed within the broader anxiety disorders literature employed considerably different methodologies when compared to the two studies of MI for PTSD, suggesting that future PTSD studies may expand upon current results by employing cleaner study designs. Additionally, results from both the PTSD and other anxiety disorder literatures suggest some limitations to traditional assessments of SOC, indicating a need for greater attention to measures of the efficacy of MI on preparing client for action stage treatments. Overall, although limited to initial trials, available results for studies of MI as a prelude to CBTs for GAD, PD, social phobia, and OCD, show promise for the ability of MI to address many of the problematic aspects of current PTSD treatments and encourage future research to better explore the applicability of MI to CBTs for PTSD.

E. **MI as an Augmentation for CPT**

As reviewed above, MI has successfully been used to target ambivalence, decrease attrition, and increase response to treatment across a number of disorders, including several closely related to PTSD (Arkowitz & Burke, 2008). Additionally, initial research in the area of PTSD lends support to the utility of MI as a potential complement to PTSD treatments (Murphy, Cameron et al., 2004; Murphy et al., 2009). Moreover, a review of predictors of differential response to CBTs for PTSD revealed

many predictors of non-optimal response to treatment (dropout and non-response) and

positive treatment response, which warrant increased clinical focus. Although

ambivalence has not been examined directly in the PTSD literature, a review of this

concept in the context of the predictors of differential response in PTSD underscored the

role of ambivalence in current PTSD dropout and non-response. Specifically, it was

discussed that many symptom level predictors of non-optimal response might contribute

to clients' ambivalence by producing motivations not to change (e.g., not wanting to

discuss the trauma, feeling shame about disclosure of certain elements of the event) or

doubts about their own efficacy for change (e.g., "This therapy will not work for me" or

"I am too damaged"). Similarly, process-level predictors of outcomes can be

conceptualized as behavioral indicators of ambivalence (e.g., inconsistent attendance,

decreased homework compliance, etc.). Taken together, these diverse lines of research

lend support to the notion that MI may be a useful augmentation to address the

problematic issues of dropout and non-response among otherwise effective CBTs for

PTSD. Previous literature examining the use of MI techniques as a compliment to CBT

has included only group treatment formats and no work to date has examined MI as an

augmentation to a specific CBT approach for PTSD. This study seeks to address this gap

in the literature by examining how MI would fit as an augmentation to CPT for PTSD

within an individual format, especially in light of the meta-analytic finding that MI is

more effective in individual format (Lundahl & Burke, 2009).

Given the equivalent effectiveness results for the major CBTs at present,

including the results of many head to head trials (Bisson et al., 2007), and the ubiquity in

issues of dropout and non-response among current CBTs for PTSD (Ehlers et al., 2010),

MI could be selected as a compliment for any current CBT. CPT was selected here based on several important factors. First, CPT is specifically derived to treat PTSD and is administered in a standard fashion, unlike many other CBTs which utilize a flexible application of techniques in each case (Resick, Monson et al., 2008). This allows for a more detailed assessment of the theoretical and practical alignment of MI and CPT. However, as discussed above, CPT is a well-supported CBT for PTSD that represents a range of CBT techniques, including cognitive restructuring and a written assault account. As such, CPT provides a model for how MI could complement other behavioral and cognitively based PTSD treatments. Finally, CPT is self-described as primarily a cognitive therapy (Resick, Monson et al., 2008), which provides unique overlaps with MI techniques that may be de-emphasized in exposure therapies (e.g., use of Socratic dialogue). Thus, this section will discuss the specific fit between CPT and MI at both the level of the therapeutic techniques employed and in their theoretical approaches to PTSD, as well as how this merger may address the predictors of differential treatment responses in PTSD.

At the broadest level, drawing on the TTM's SOC as an overarching framework, MI conceptually precedes CPT as a preparation stage for the action stage of CPT. Thus, an augmentation using MI as a preparation for CPT would allow individuals to develop and solidify motivation for change prior to commencing the active change work in trauma-focused therapy. This may be helpful in two ways. First, work in other areas of anxiety research and initial work within PTSD indicates that not all clients begin CBTs for anxiety in an action stage (Murphy, 2008; Westra & Dozois, 2008). Thus, an action-oriented CBT model may not meet all clients at the appropriate SOC. As such,

preparation with MI might help clients to resolve remaining ambivalence about the change itself and increase readiness to move into an action stage treatment like CPT. However, bearing in mind the non-linear stages of the SOC, even clients who present for treatment in an action stage may still encounter difficulties with ambivalence or decreases in RTC throughout the therapy process (Prochaska & Norcross, 2002). For these individuals, MI prior to CPT would still allow time to predict barriers to treatment to solidify RTC, which may bolster against later slips in RTC during CPT. With this foundation, once in CPT, clients may be more able to consistently focus on changing trauma-related symptoms and processes, as opposed to grappling with potential ambivalence during CPT, thus diluting the specific trauma-focus of the work, an element thought to be crucial to CPTs success (Resick et al., 2010).

Given the posited role of ambivalence as an important factor in both dropout and non-response, the consistent treatment of ambivalence across these therapies is critical. Fortunately, both CPT and MI emphasize understanding and empathetically validating ambivalence (Miller & Rollnick, 2002; Resick, Monson et al., 2008). Yet, MI as an augmentation to CPT prior to active trauma-focused treatment adds to the CPT process for addressing ambivalence in important ways. First, as the focus of CPT is on the resolution of trauma-related symptoms, CPT necessarily addresses ambivalence once it has been identified as a problem in therapy. Thus, ambivalence is only directly addressed once the client's behaviors are already creating barriers to change. MI further validates and normalizes ambivalence by placing it up front in treatment (Arkowitz et al., 2008). This creates the opportunity for clients to explore any existing ambivalence to change or to treatment *before* dropout or treatment interference patterns occur. This initial focus

may also allow clients to more easily address and confront ambivalence with the therapist once CPT begins, allowing for a more fluid and consistent focus on trauma-related work. This was supported by a recent qualitative study in which clients endorsed a complementary role of MI as being a helpful preparation to understand the issues they needed to work on in therapy (Kertes et al., 2010). The general alignment of the treatment of ambivalence is critical to the success of merging MI and CPT; however, it is also important to consider how specific ambivalence related factors would be treated using MI for PTSD.

Several PTSD symptoms and related clinical features were identified as predictors of non-optimal response and may contribute to increased ambivalence. Augmenting CPT with MI prior to treatment would allow clients to begin combating potential symptom-driven ambivalence prior to trauma-focused work in several ways. First, during MI, clients would be asked to consider if symptoms or patterns related to PTSD are problems they would like to change (e.g., clients may want to sleep better, but not want to face their traumatic memory) and to consider discrepancies in their current internal motivation. Additionally, clients could identify and label behaviors that represent ambivalence around the decision to change problems (e.g., reacting angrily or withdrawing). This opportunity would allow them to explore the costs and benefits to changing these patterns prior to engaging in active change work. Similarly, clients could identify and process fears about treatment itself, which was noted as a frequent reason for dropout in a clinical survey (Zayfert & Becker, 2000) and the amelioration of which predicted entrance into treatment for OCD (Maltby & Tolin, 2005). Finally, MI would allow clients to predict and prepare for the ways in which PTSD-related symptoms might

become barriers to treatment (e.g., avoidance of therapy or thoughts that treatment will not work for them). Thus MI addresses potential symptom driven dropout and non-response in three novel ways: 1) allowing clients to consider if a specific symptom is a problem they would like to change, 2) allowing clients to consider why they might not want to change certain symptoms and deciding if the task of treatment is worth the benefits, and 3) allowing client to consider how these symptoms might become barriers to treatment before embarking on the task of symptom-change. All of these may help forestall ambivalence, thus reducing the risk of early treatment termination, as well as the dilution of trauma-focused work in CPT and non-response to treatment.

Let us consider these principles in the context of specific PTSD outcome response predictors. For example, higher PTSD symptom severity, and higher avoidance symptoms specifically, predict poorer treatment response, possibly due to the contribution of avoidance to ambivalence surrounding symptom change involving facing the trauma. At present CPT addresses the role of avoidance through psychoeducation and addresses markers of ambivalence (e.g., homework non-compliance, missed sessions, etc.) through collaborative problem solving and use of the therapeutic rationale throughout treatment. However, current rates of dropout and non-response demonstrate that these approaches are not sufficient for all trauma survivors (Bradley et al., 2005). If survivors were assisted in considering the pros and cons of avoidance (e.g., avoiding emotional pain in the short term while increasing nightmares), the impact of their trauma-related avoidance (including potential avoidance of therapy), as well as the costs of PTSD treatment (i.e., facing their trauma), prior to trauma-focused treatment in a validating environment, they could decide if they would like to change this specific behavior and

use internal motivation to commit more fully to the task of therapeutic change. Similar

processes could be undertaken with any PTSD symptom or related clinical feature (e.g.,

anger, anxiety and worry, substance use, etc.) or the prioritizing of logistic barriers to

help each individual client process the challenges that they may face in the therapeutic

process with the support of a therapist who sees their ambivalence as reasonable and

worthy of consideration prior to the beginning of change work.

Similarly, several of the symptom-related factors identified as indicators of

dropout and non-response reflect potential hopeless or self-defeating cognitions regarding

the therapy itself or clients' ability to succeed in treatment. For example, as discussed by

Bryant et al. (2007), individuals who catastrophize may predict that they will not be able

to succeed in treatment or meet treatment demands. Individuals who sense that they have

been permanently changed or who are experiencing high levels of hopelessness may want

to change but may also believe that treatment will be unable to work for them. CPT

offers many tools that help address these potential ambivalence-producing cognitions.

First, a discussion of the therapeutic rationale and treatment plan is designed to help the

client understand the demands of treatment as well as how therapy will be effective.

Similarly, hope instillation is a large part of any first session of CPT and is designed to

increase clients' belief that they can achieve change (Resick et al., 2010). MI adds

several additional techniques to address clients' ambivalent approach to treatment. First,

ambivalence fostering symptoms (e.g., hopelessness) and cognitive styles (e.g., sense of

permanent damage or catastrophizing) can be identified and explored through MI as

motivations not to change and potential barriers for treatment, and revisited as needed

using Socratic dialogue during CPT as needed. Additionally, as the therapist works on

developing discrepancy in MI, the discrepancy of clients' behavior of treatment seeking

and simultaneous belief that they cannot meet the demands of treatment can be explored.

Finally, self-defeating, hopeless, and catastrophizing cognitive patterns may be balanced

by MI's focus on increasing self-efficacy, which aims to increase clients' beliefs that they

can succeed in making desired changes, thus challenging clients' cycle of hopeless or

defeated self-cognitions regarding treatment that may produce ambivalence during CBT.

As such, MI offers several complementary techniques for targeting predictors of non-

optimal PTSD treatment responses.

Once trauma-focused therapy begins, many elements of the existing CPT theory

and protocol are also consistent with MI principles. CPT, like all CBTs, is built upon

mutual respect and conceptualized as a team approach (Resick & Schnicke, 1992). This

approach fits nicely with the client-centered yet directive stance of MI (Miller &

Rollnick, 2002) in that both therapeutic approaches emphasize the clients' role as the

directors of the therapeutic process with the assistance and consultation of the therapist

who is directive only in ways consistent with helping the clients to realize their own

therapeutic goals. At a practice level, MI utilizes clients' own reasons for change and

intrinsic motivation to promote RTC. This approach is consistent with the use of the

Socratic method, which is critical to CPT's success, such that the decision to change lies

in the client's hands with the clinician acting as a guide and consultant during the

process. Similarly, the CPT protocol includes psychoeducation designed to educate

clients about the potential interference of avoidance along with instructions for clinicians

to routinely ask clients to anticipate barriers or avoidance to homework compliance and

to address any ambivalence noted in treatment (Resick et al., 2010). The resolution of

ambivalence during MI would likely lead to decreased ambivalent behaviors during

treatment; however, careful attention to potential indicators of ambivalence, such as

inconsistent treatment attendance or homework compliance, could help to continue the

processing of ambivalence throughout treatment. If apparent during CPT, these

behaviors could be discussed using an MI and CPT consistent stance drawing on the

client's own motivational decisions and rationale, developed during MI sessions. Thus

the MI augmentation of CPT could further complement the specific cognitive strategies

already used within the CPT model providing enhanced treatment of ambivalence

throughout the therapy process, with the goal of improving PTSD treatment outcomes for

survivors.

F. Current Study

The present study sought to implement MI prior to CPT (MI+CPT) to investigate

the ability of the MI intervention to influence ambivalence and RTC prior to and during

trauma-focused treatment and to enhance the efficacy of CPT for decreasing PTSD and

related psychopathology (i.e., depressive symptoms). This augmentation involved two

related components. First, MI was used as a preparation for CPT, building and

solidifying motivation to change. Second, MI skills were utilized throughout the CPT

protocol to bolster motivation and enhance participant engagement in the treatment

process. These interwoven aims were assessed using two strategies. For each

hypothesis, the results of the MI intervention were first tested to assess for meaningful

change within the pilot sample. Second, the results of participants assigned to MI+CPT

were compared to a sample of participants in a parallel trial (the Hypnosis Study)

conducted simultaneously in the same facility using the same measures, assessors, etc. (described in detail below). There were several important differences between the two research projects (also described below). Finally, the MI study results were located within the larger literature throughout the discussion to allow for comparison with the larger literature.

Specific Aims and Hypotheses

Aim 1. We first sought to investigate the ability of MI to influence ambivalence and RTC prior to CPT. Given the lack of clarity in the current literature regarding the measurement of factors related to the change process, several factors were assessed.

Hypothesis 1.   It was hypothesized that MI would increase RTC in the pilot sample. We specifically anticipated that MI participants would report increases in RTC between pre-treatment and following MI prep sessions (i.e., at mid-treatment). 1a) Comparison RTC data were also available for the comparison sample. It was additionally anticipated that participants in the previous study who did not receive MI would evidence fewer changes in RTC between pre-treatment and CPT than MI+CPT participants.

Hypothesis 2.   Second, it was hypothesized that MI participants would report an increase in the pros of changing and a decrease in the cons of changing following MI. Although there is no universally accepted measure of ambivalence, the pros and cons of change capture the decisional balance inherent in wanting and not wanting change, and are judged to be the closest marker of ambivalence available.

Hypothesis 3.   Third, it was hypothesized that MI participants would evidence increases in CPT treatment expectations and a reduction in fear of treatment

following MI.

Aim 2. Next, this study sought to investigate the utility of augmenting CPT with MI components throughout the CPT protocol. Specifically, we aimed to investigate the utilization of MI during the CPT protocol and impact of MI implementation on RTC during the CPT protocol.

> *Hypothesis 4.*   Specific hypotheses were limited given the novel nature of the MI augmentation; however, it was anticipated that participants would vary in their need for MI supplementation during the CPT process.

> *Hypothesis 5.*   Finally, it was hypothesized that the use of MI components during the CPT protocol would result in changes in RTC at the following session, specifically that RTC would increase following MI augmentation at the prior session.

Aim 3. The final aim of the current study was assess the tolerability of MI+CPT and to test the efficacy of the pilot intervention on conventional trauma-focused treatment outcomes.

> *Hypothesis 6.*   It was hypothesized that MI+CPT participants would rate the overall therapy experience positively, and that ratings would be comparable to CPT without MI (6a). Similarly, we anticipated that MI+CPT participants would endorse MI techniques, both during the initial MI sessions and during CPT, as helpful to maintaining their motivation for change.

> *Hypothesis 7.*   It was hypothesized that MI+CPT participants would evidence a low dropout rate in the context of the broader PTSD treatment literature. 7a) Similarly, it was anticipated that a higher percentage of participants who began

MI+CPT would complete CPT than those who began CPT without MI in the comparison Hypnosis study.

Hypothesis 8.   It was anticipated that the MI intervention would influence treatment engagement as measured by CPT treatment credibility ratings at CPT session 1, missed sessions, and homework completion. 8a Consistently, it was hypothesized that MI participants would evidence higher engagement than those who began CPT without MI (i.e., higher treatment credibility at session 1 of CPT, more consistent therapy attendance during CPT, and better compliance with CPT homework than individuals who did not receive MI).

Hypothesis 9.   It was further hypothesized that the MI intervention would have the additional benefit of positively influencing PTSD and depressive symptoms. 9a) It was anticipated that MI+CPT participants would realize greater PTSD and depressive symptom changes at follow-up than individuals who received CPT without MI.

G. Methods

Participants

Eligible participants were adult females who met criteria for a current PTSD diagnosis related to a physical and/or sexual assault at least 6 months prior. There was no upper limit on time since assault. Exclusion criteria for participants included psychosis, mental retardation, active suicidality, parasuicidality, or current addiction to drugs or alcohol. In addition, participants could not currently be in an abusive relationship or being stalked. For marital rape or intimate partner violence, the participant must have

been out of the relationship for at least 3-months. Participants could continue the use of any psychiatric medications throughout the study. However, they had to keep their medication usage stable for the duration of the study and had to be stabilized on any new medication for 1-month prior to the pre-treatment assessment. Finally, participants could have received any therapy in the past, with the exception of CPT, and could be receiving concurrent therapy as long as it was not trauma-focused.

In all, 33 women were assessed for eligibility. Of these, 10 did not meet study criteria (8 PTSD negative, 1 peri-traumatic exposure, and 1 suicidal ideation) and an additional 2 participants did not complete the assessment. Of the 21 women enrolled into the trial, 4 met initial study exclusion criteria subsequent to randomization (2 for medication instability and 2 for current psychosis). Thus, the MI intent-to-treat (ITT) sample consisted of 17 women who were immediately enrolled into the MI+CPT trial.

Procedure

Female survivors of physical and/or sexual assault were recruited for the MI study from the greater St. Louis metropolitan area through many of the same mechanisms used for recruitment of participants in recent treatment trials. The primary source of participant recruitment was through self-referral to ongoing projects and through our clinic. Referral sources included many metropolitan victim assistance programs, local agencies and therapists, as well as fliers posted at grocery stores, laundromats, and on college campuses. Graduate research assistants described the study to potentially eligible callers during a clinical intake call. Female participants, at least 18 years of age, who experienced a physical and/or sexual assault as least 6-months prior were screened for eligibility. Interested participants meeting the initial inclusion requirements were

scheduled for a pre-treatment assessment. During the pre-treatment appointment, the therapist obtained informed consent, conducted the clinician administered interviews, and administered the self-report measures. There were no adverse events and the study was conducted with UMSL Institutional Review Board approval.

Eligible participants were enrolled directly into MI+CPT (described in detail below). The first MI session was scheduled at least 1 week after the pre-treatment appointment. Following the three MI sessions participants completed a brief mid-treatment diagnostic assessment before beginning CPT. Participant progress in therapy was measured across multiple domains. PTSD and depressive symptom severity as well as RTC and ambivalence were measured at every session. Additionally, the therapist tracked participant attendance and participants completed a homework compliance measure at each session. An independent assessor conducted a post-treatment assessment approximately 2-weeks after participants completed treatment and a follow-up assessment 3-months after therapy completion using the CAPS and SCID-I as well as self-report measures (see Measures section below for details).

All study assessment and treatment was provided free of charge. The current trial did not advertise any additional participant compensation, above the provision of free treatment. Following the completion of treatment or premature termination, all participants were offered $50 for the completion of a final assessment. It was hoped that advertising only free treatment would allow for a more clear assessment of participant motivation in the MI trail, would more closely mimic current clinical practice, although other issues of secondary gain (e.g., seeking disability compensation) may still have existed. Compensation at the post-treatment assessment was added to increase low

response to assessment.

Comparison Sample

The MI study employed a comparison sample of participants from a concurrently conducted study (Sleep-Directed Hypnosis as a Complement to CPT in Treating PTSD; National Center for Complementary and Alternative Medicine 1R21AT00407) at the Center for Trauma Recovery (CTR).   Briefly, the Hypnosis study aimed to address sleep concerns prior to CPT to increase cognitive functioning and decrease arousal prior to the initiation of CPT with the goal of enhancing overall CPT outcomes. Like the MI study, the Hypnosis study included PTSD-positive women seeking treatment related to an interpersonal assault. Women in the Hypnosis study were randomized to either 3 sessions of sleep-directed Hypnosis Training plus 12-sessions of CPT (Hyp+CPT) or 3 weeks of Symptom Monitoring plus 12-sessions of CPT (SM+CPT).

The Hypnosis study drew from 181 women who were assessed for eligibility. Of these, 62 did not meet study criteria and 11 individuals did not complete the assessment. In all 108 women were randomized into the Hypnosis study, 16 were removed from analysis in the study by design for meeting exclusion criteria subsequent to eligibility. Thus, the Hypnosis ITT study sample ($N = 92$) included 48 SM+CPT participants and 44 Hyp+CPT participants. As described in the Results section below, there were no demographic or trauma history differences between the MI and Hypnosis ITT samples (see Table 1). Similar to the MI study, there were no adverse events and the study was conducted with UMSL Institutional Review Board approval.

All Hypnosis study inclusion and exclusion criteria were the same as described in the MI study sample above, except that participants in the Hypnosis study had to meet

criteria at least moderate sleep impairment at pre-treatment and had to be at least 3-months (not 6-months) post trauma. The sleep criterion was not retained for the MI study sample, but was not anticipated to skew the eligible pool to a large degree. Sleep disturbance is one of the most commonly reported symptoms of PTSD, occurring in the vast majority of those diagnosed (Maher, Rego, & Asnis, 2006). As described in the Results section and seen in Table 1, participants in all conditions fell in the clinical range of sleep disturbance, but there was a significant difference between conditions on initial sleep disturbance such that MI+CPT participants reported lower initial sleep symptom severity than SM+CPT or Hyp+CPT participants. The three conditions were not statistically different on total symptom severity of PTSD and depression at pre-treatment. Thus, the difference in sleep impairment did not appear to impact the overall severity of the sample. Similarly, the minimum time since trauma was extended to 6 months in the MI study, from the 3-month criteria in the Hypnosis study, to allow time for ambivalence to manifest. A total of 8 out of 92 Hypnosis study participants (8.70%) selected an index, or worst, traumatic event between 3 and 6 months prior to treatment. These participants were retained in the comparison sample as each of them also endorsed abuse in childhood, and thus could have met the 6-month post-trauma criteria of the MI study. Moreover, there were no differences between study conditions on trauma history, demographics, initial symptom severity, or readiness to change. Thus, the time since index trauma criteria does not appear to have impacted pre-treatment presentation.

Hypnosis procedures followed a similar timeline to the MI study, with assessments completed at pre-treatment, mid-treatment (prior to CPT), post-treatment, and 3-month follow-up, in addition to weekly symptom measures. However, in addition

to receiving free therapy services, women in the hypnosis trial were compensated for assessments ($50 for pre-treatment, $25 for mid-treatment, $75 for post-treatment, and $100 for 3-month follow-up).

Although this comparison is limited by the non-randomized nature of the MI condition and some protocol differences, utilizing this ongoing trial as a potential comparison was optimal for several reasons. First, given the small nature of this pilot trial, randomizing the sample into an MI+CPT condition and a within study comparison condition would have significantly limited the power of the study and the amount of data gathered regarding the implementation of MI. The proposed non-randomized comparison allowed for the closest approximation possible to a randomized control condition. The two studies drew from the same community, using identical recruitment methods, and were completed in at the same facility. Moreover, the MI study employed the same therapist, assessors, and the clinical supervisor as in the Hypnosis study. Additionally, the ability to compare MI+CPT with two conditions providing both symptom monitoring and an alternate therapy prior to CPT provides a stronger assessment of the unique effects of MI. Specifically, both Hypnosis study conditions control for repeated assessments and the monitoring of symptoms. The Hyp+CPT condition also controls for weekly therapist contact, rapport, and an active intervention. Finally, the MI+CPT sample was compared wherever possible with the larger PTSD treatment outcomes literature to locate the MI study outcomes within the broader literature.

Measures

Interviews.

Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995) is a 22-item scale with three associated features assessing validity, severity, and improvement. The CAPS contains separate 5-point frequency and intensity rating scales (0-4) for symptoms identified with PTSD in the DSM-IV. The CAPS also has items that rate social and occupational functioning, global PTSD symptom severity, and the validity of the participant's responses. Inter-rater reliability on both frequency and severity ratings is reported to be better than .92 for each of the three symptom clusters. Internal consistency was also good for the three subscales using intensity ratings with an alpha of .87 for each of the symptom clusters (Weathers et al., 1992). Convergent validity was high for the following measures: Mississippi Scale for PTSD, .91, MMPI-2 PTSD scale, .77 and SCID PTSD, .89. In the current study the CAPS was used to establish a PTSD diagnosis and to measure the severity of PTSD symptoms at each assessment time point. Internal consistency in the current study was high ($\alpha = .89$).

Structured Clinical Interview for DSM-IV-Patient Version (SCID; First, Spitzer, Gibbon, & Williams, 1996) is a diagnostic interview developed based on criteria from the DSM-IV. The SCID was used to assess commonly co-morbid Axis I disorders (Mood Disorders, Substance Use Disorders, and panic disorder). The interview has generally yielded moderate reliability coefficients. For most of the major categories (bipolar disorder, major depression, alcohol abuse/dependence), test-retest reliability was established with kappas for current and lifetime diagnoses were above .60, with mean kappas of .61 for current and .68 for lifetime diagnoses for the combined samples.

Self-report measures, psychopathology.

Posttraumatic Stress Diagnostic Scale (PDS; Foa, Cashman, Jaycox, & Perry,

1997) is a brief screening and diagnostic instrument designed to assess the presence and severity of PTSD based on the 17 DSM-IV criteria (APA, 2000). It is a clinically oriented, four-part, 49-item self-report instrument. The current study used section three, which assesses the 17 symptoms of PTSD. Items are rated on a 4-point severity scale and summed with higher scores indicating more severe symptoms. The PDS demonstrated high internal consistency (alpha = .92) and test-retest reliability (kappa = .74 for PTSD diagnosis; kappa = .83 for total PDS score). In addition, the PDS-derived diagnosis had high agreement with the SCID-I (First et al., 1996) and good sensitivity and specificity. Internal consistency in the current study was high (α = .80).

Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996) is a widely used measure of depressive symptoms. The BDI-II contains 21-items assessing cognitive and behavioral depressive symptoms corresponding to the DSM-IV criteria for major depressive disorder. Items are rated on a 4-point severity scale. Total scores are obtained by summing the items with higher scores indicating more severe symptoms. Internal consistency in the current study was high (α = .90).

Self-report measures, RTC and ambivalence.

University of Rhode Island Change Assessment (URICA; McConnaughy et al., 1983) is a 32-item self-report measure of RTC. The URICA is a widely used, generic assessment of four stages of change (pre-contemplation, contemplation, preparation/action, and maintenance). Items are rated on a 5-point Likert-type scale from 1 (*strongly disagree)* to 5 (*strongly agree)*. The four-factor structure was validated in two outpatient samples and each of the subscales had good internal consistency (α's = .88 to .89) (McConnaughy, DiClemente, Prochaska, & Velicer, 1989; McConnaughy et al.,

1983). The scale also includes cutoffs to produce a stage of change based on the total

readiness score, which will be used only for descriptive purposes. A recently developed,

trauma specific form (URICA-T; Hunt et al., 2006), which replaces the term "problem"

with "trauma issues", has also demonstrated adequate reliability (α's = .61 to .80) in an

initial sample of 42 individuals with comorbid PTSD and substance dependence. The

URICA-T total score was associated with study retention in Hunt et al.'s sample. The

original URICA has also demonstrated adequate internal consistency in a sample of 53

PTSD-positive veterans (α's = .80 to .88). The current study utilized the original form of

the URICA with specific instructions to focus on "trauma symptoms". This procedure is

in line with the majority of previous studies using MI as a precursor to CBT (Maltby &

Tolin, 2005; Westra et al., 2009; Westra & Dozois, 2006). Internal consistency for each

subscale in the current study was high (α's = .80 to .91).

　　　　Pain Stages of Change Questionnaire (PSOCQ; Kerns, Rosenberg, Jamison,

Caudill, & Haythornthwaite, 1997) is a 30-item measure, originally designed to assess

readiness to begin to manage pain symptoms. The four-factors (pre-contemplation,

contemplation, preparation/action, and maintenance) were found to be internally

consistent (α's = .77 to .86) and stable over time (1-2 week test re-test reliability = .74 -

.88) with good support for discriminant and criterion-related validity. This measure was

modified to assess trauma symptoms (MPSOCQ) as a comparison to the URICA, and

was piloted in the comparison sample. While not optimal, modifications across patient

populations have been a consistent practice within the burgeoning MI literature

(Arkowitz et al., 2008). Internal consistency for each subscale in the current study was

high (α's = .80 to .86), with the exception of the contemplation subscale (α = .63).

Psychotherapy Decisional Balance Scale (PDBS; Bellis, 1994) is a 20-item

instrument that assesses the pros and cons of engaging in psychological therapy. It

demonstrated internal consistency and discriminative validity in the original outpatient

sample. Additionally, each factor demonstrated adequate internal consistency in Rooney

et al.'s (2005) sample of 53 PTSD-positive veterans (α = .87 pros and .90 cons). Internal

consistency for each subscale in the current study was acceptable (α = .77, pros and

cons).

Therapeutic Outcome Questionnaire (TOQ; Foa et al., 1991) is modified from the

Expectancies Rating Form (ERF; Borkovec & Nau, 1972)*,* a widely used brief measure

of treatment expectations and credibility. The TOQ has previously been used with the

CPT protocol (Resick, Galovski et al., 2008). Four items are rated, from 1 (*not at all*) to

9 (*extremely*): How logical does this type of treatment seem to you? How successful do

you think this treatment will be in reducing your trauma-related symptoms? How

successful do you think this treatment will be in reducing other personal problems? How

confident would you be in recommending this treatment to a friend with similar

problems? The ERF composite score demonstrated adequate internal consistency (α =

.73) in an OCD sample (Maltby & Tolin, 2005). Internal consistency in the current study

was also adequate (α = .78).

Fear of therapy. To the knowledge of the researchers no measure currently exists

to measure fear of change or fear of therapy. However, this factor was indicated as an

important predictor of entrance into therapy in a related study of OCD (Maltby & Tolin,

2005). As such, this study employed a single item measure of fear of entrance into

therapy, identical to that used in the previous trial (assessed using a single item rated

from 0, *I am not at all afraid to start therapy*, to 100, *I am so afraid to start therapy that I could not stand it*).

Therapist feedback form. Participants were asked to provide feedback about their experiences in treatment at the post-treatment appointment. This home grown measure has been used in several previous CPT trials at CTR (Resick, Galovski et al., 2008; Resick et al., 2002) and provides quantitative (e.g., Please rate your overall level of satisfaction with this therapy) and qualitative information (e.g., What did you like about your therapist?) regarding client experiences. MI+CPT participants were also asked to provide feedback about their experience of MI to qualitatively assess the tolerability of this additional treatment component.

Therapy process measures.

Engagement and Homework Compliance. Homework compliance was tracked at each CPT session in two ways. First, the therapist tracked both the number of times the participant practiced the assigned skills and the number of minutes spent practicing each skill, as well as the degree to which out of session work was helpful. These homegrown measures correspond to the assignment given in the preceding session as well as to all previous assignments and provide the clinician with a good basis for deriving amount of time spent working on therapeutic issues (in accordance with therapy protocol) which can then be divided by the number of days since the last session. Second, the therapist completed a measure of client engagement in session as well as perceived client homework compliance per specific assignment at each session.

Attendance. Session attendance, out of session contact, no showed appointments, and cancellations were tracked as part of routine clinical care by the

therapist and tallied at the close of each case.

   MI utilization tracking. The therapist tracked the use of MI techniques

throughout the MI and CPT protocols to document the specific techniques used, the

reason for their use, and the perceived participant response to the techniques.

Treatment Condition

   All participants in this pilot project were assigned to MI+CPT. Resick et al.'s

(2010) updated CPT protocol, was utilized following 3-sessions of MI according to

Westra and Dozios's (2003) MI protocol. This MI protocol was designed specifically for

use in the anxiety disorders. This project aimed to further refine the treatment manual for

future use in PTSD positive populations. Thus, Westra and Dozios's manual served as a

basis for the MI augmentation. The initial 3-session format was kept consistent to allow

for comparison and ensure the retention of empirically validated treatment elements,

while simultaneously integrating trauma specific-elements into the MI protocol. The MI

techniques developed in the initial sessions were utilized as needed during the CPT

protocol, thus providing a fluid transition through these two approaches. Participants

completed between 9 and 12 sessions of CPT, according to their progress in therapy.

This practice is in keeping with the larger literature, in which participants who complete

75% of the treatment protocol, and who are PTSD negative, are considered treatment

completers (e. g., Blanchard et al., 2003). Similarly, this practice is supported by recent

research suggesting the majority of survivors can achieve good endstate functioning prior

to the completion of a full 12 sessions of CPT (Galovski et al., 2012). Thus, the present

study ensured that all participants obtained the full CPT skill set, but allowed participants

to terminate if they meet good endstate functioning prior to session 12. (Participants in

the Hypnosis study completed the full 12 session protocol, and no participants terminated

from that trial during the last three sessions). A description of the augmentation of CPT

with MI is provided below.

Cognitive Processing Therapy. CPT is primarily a cognitive treatment, which

incorporates elements of cognitive restructuring as well as memory or emotion

processing. Like most CBTs, CPT first introduces the client to PTSD and CPT to set the

stage for a collaborative endeavor and to provide psychoeducation about the therapy

process. Two overarching goals are then addressed. One goal of CPT is to assists the

client in processing the emotion-laden traumatic memory. This goal is accomplished by

resolving conflicts between memories of the event that have been avoided and fully

integrating them with pre-existing schemas. Specifically, clients are asked to write,

think, and talk about the worst traumatic event they have experienced. In the memory

processing component participants are encouraged to activate their memory of the event

and to experience their emotions. The other focus of treatment is on the integration of the

meaning of the event into the client's larger worldview. Toward this end, clients are

assisted in differentiating accurate interpretations from faulty cognitions or "stuck points"

by writing about the impact of the assault on their beliefs as well as using ABC sheets to

learn the connection between events, thoughts, and feelings. Clients are then taught skills

to assist them in challenging stuck points and generating accurate alternate thoughts.

The initial focus of the cognitive work surrounds specific stuck points about the

assault itself (e.g., "It must have been my fault" or "Maybe it wasn't really a rape"). Once

these assimilated cognitions are resolved, over-accommodated beliefs about other areas

of functioning are addressed with a focus on the five areas of functioning identified by

McCann, Sakheim, and Abrahamson (1988) that are frequently affected by victimization: safety, trust, power/control, esteem, and intimacy. Each of these areas can be divided into beliefs regarding oneself and beliefs regarding others. CPT then concludes by asking the client to re-assess the impact the event has had on their worldview with a focus on identifying resolved stuck points and engaging clients in relapse prevention.

　　　　Motivational Interviewing Augmentation. Westra and Dozios's (2003) protocol is a supplement to Miller and Rollnick's (2002) seminal work, and retains their flexible format for change based on the knowledge that individuals enter the change process with varying degrees of readiness. Westra and Dozios integrate this flexible approach into a two phase individualizable protocol that retains all of the empirically supported elements of MI. Clients are first introduced to the concepts of ambivalence and the stages of change model with the dual goals of normalizing ambivalence and providing an understandable treatment rational. Next, the therapist utilizes the MI principles according to the client's level of readiness. Specifically, in phase 1, the therapist assists the client in exploring and resolving ambivalence around change. This is done flexibly depending on the client's level of change versus sustain talk, with the goal of building discrepancy to achieve a resolution to change. It is in phase 1 that the therapist could, depending on the client's RTC, assist the client in elaborating upon the problems they have and deciding if they would like to change them. In phase 2, the focus of the work shifts to preparing for change and building self-efficacy. This second phase of treatment consists of deciding how to bring about desired changes (e.g., "Is therapy worthwhile?"), anticipating roadblocks to change, and building positive self-statement about one's ability to change. The session by session augmentation is outlined below.

Session	Traditional CPT	MI Augmentation
MI 1*	n/a (Very brief summary of trauma-focused treatment provided; Acknowledge trauma while keeping MI focus)	Psychoeducation regarding MI and ambivalence. Identify problems in life potentially contributing to distress. Discuss areas that participant may not have considered. Dialogue is consistent with traditional MI and is not trauma specific in these first three sessions.
MI 2*	n/a (Discuss problems in terms of where clients are "stuck")	Continue to weigh costs and benefits of problems. Consider five core belief systems (CPT 8-12) and related problems. Focus on developing discrepancy or building self-efficacy for change based on client's stage of change.
MI 3*	n/a (Begin to introduce meta-cognition)	Continue discussion of meaningfulness of abandoning problems for therapeutic movement in the direction of change. Increase awareness of discrepancies thus laying groundwork for preparedness for trauma-focused therapy. Continue building self-efficacy and consider barriers to change.
CPT 1	Psychoeducation: PTSD & avoidance, cognitive theory & application in treating PTSD. Education regarding identification of "stuck points". Assign Impact Statement.	Integrate identified "problems" into session 1 of CPT and acknowledge their role specifically in the development and maintenance of PTSD. Begin to label as PTSD avoidance. Identify trauma-specific cognitions and introduce as CPT "stuck points". Ask individual to consider identified problems in writing the Impact Statement for the following session.
CPT 2	Impact Statement. Early identification of stuck points and gentle Socratic questioning. Relationship between thoughts & emotions. Assign ABC sheets	Rely on problem list developed in MI sessions to continue to trace and explore the meaningfulness of the traumatic event and identify any stuck points maintaining PTSD. Continue to assess and monitor RTC and rely on MI skills developed in early MI sessions to increase motivation to continue with therapy if needed.
CPT 3	ABC sheets: continue to identify stuck points. Challenge with Socratic Dialogue. Assign trauma narrative.	Continued exploration of identified problems. Continued assessment of RTC and reliance on MI techniques if readiness falters. MI dialogue used to discuss any ambivalence around writing of trauma narrative.
CPT 4	Read trauma narrative aloud to therapist. Process natural	Specifically identify any stuck points related to difficulties with out-of-therapy practice

	emotion. Identify and challenge stuck points with Socratic questions. Re-assign narrative.	assignments (i.e. If I engage in therapy, I will become overwhelmed). Integrate MI techniques with Socratic dialogue to address stuck points and discuss costs and benefits of PTSD positive status quo versus change.
CPT 5	Reread narrative, identify stuck points. Introduce challenging questions. Assign challenging questions practice.	Continue to utilize MI techniques to increase motivation if necessary. In the case of motivated client, begin to revisit original problem list. Use as a resource to tailor treatment to problem list and continue to increase meaningfulness of change to individual participant.
CPT 6	Review challenging questions. Introduce faulty thinking patterns. Therapy shifts to more current stuck points.	Continue to monitor RTC, utilizing MI techniques if motivation is lacking. May rely on problem list to hone and tailor therapy (identification of stuck points, etc.) to individual if necessary.
CPT 7	Review faulty thinking patterns. Introduce challenging beliefs worksheets (cbw's) and first of five modules.	Use faulty thinking patterns to encourage the participant to generalize the skills to more current patterns of thought. MI skills can be used to increase motivation towards meaningful change in participants' daily life.
CPT 8-12	Review modules and related cbw's. Specific assignments apply in last two sessions. Rewrite the Impact Statement for final session.	Additive benefit of MI in these final sessions provides the participant the opportunity to revisit the specific problems identified in MI session 2 within each of these 5 core belief systems and in final Impact Statement. MI techniques can be used to encourage continued utilization of the learned skills in relapse prevention and to predict barriers to change/ maintenance.

* This session structure were tailored to the specific client's readiness with these general elements included.

Therapists, Assessors, and Reliability and Adherence Ratings.

An advanced female CPT clinician administered all therapy. The therapist was also a primary clinician on the comparison trial. She completed training in MI (i.e., MI workshops and the use of online and video training materials) and obtained weekly supervision for adherence to the specified protocol. Supervision was provided by Tara Galovski, Ph.D., a national CPT expert with training in MI. Independent assessors were

graduate students in clinical psychology who also served as assessors on the comparison

Hypnosis trial. Consistent with recent pilot protocols, diagnostic inter-rater reliability of

assessing clinicians and therapist adherence and competence in CPT was drawn from

ongoing protocols (Constantino et al., 2008). This financially advantageous design

provides methodological integrity by assessing the reliability and adherence/competence

of study clinicians for the study measures and protocol based on concurrent assessment

and therapy, without requiring funding for these reliability measures from the pilot study.

Inter-rater reliability was conducted for a random sample of 24 CAPS

assessments in the Hypsnosis study. Reliability among coders was high for the CAPS

diagnosis, cluster scores, and total scores: K (current diagnosis) = 1.00; r = .956 (total

score), .923 (cluster B), .920 (cluster C), .897 (cluster D). Expert CPT clinicians not

otherwise affiliated with the Hypnosis study conducted adherence and competence

ratings for therapy sessions. Individual session elements are rated for presence or

absence and for quality of present elements ranging from 1 (*not satisfactory*) to 7

(*excellent*), with a 4 (*satisfactory*) midpoint. Raters coded a total of 61 sessions (8.6% of

the total 710 sessions conducted, including removed participants). Additionally, a second

independent rater coded 14 (or 23%) of these sessions to ensure reliability among

independent raters. Inter-rater agreement across sessions was acceptable on both the

presence of session elements (K = .65) and the rating of session elements (r = .46).

Using a single coding from each session, 96.78% of the unique session elements were

judged to be present and 87.71% of present items were judged satisfactory or higher. The

average rating of present elements across therapists was 4.51. Regarding essential but

not unique items (e.g., warmth, efficient structuring of session time, etc.), 93.8% of non-

unique elements were judged to be present with 92.56% of present elements judged as satisfactory or higher, with an average rating of 4.64.

Analytic Plan

Analyses were limited by the sample size in this pilot study. However, these analyses were consistent with several recent pilot trials (Constantino et al., 2008; Tuerk, Yoder, Ruggiero, Gros, & Acierno, 2010). A priori power analyses are noted throughout the analysis section, and have been computed using G-Power (Faul, Erdfelder, Lang, & Buchner, 2007) unless otherwise noted. Additionally, achieved power is documented throughout the results section to locate this study limitation more accurately. Per the G-power user guide, post-hoc power estimates are also based on hypothesized effect sizes (medium effect size of Cohen's $f = .25$ or $\omega = .30$, unless otherwise noted), not observed effect sizes, and observed correlations between measures for repeated measures statistics. Current sample effect size estimates are provided for each analysis in the results to more accurately represent the clinical significance of any changes observed. The use of effect sizes is in line with recent pilot trials and is thought to be a better estimate of change in limited samples (Constantino et al., 2008). Given the small sample, missing data was treated carefully in the present study. First, every effort was made to obtain post-treatment data from all participants in the MI study, including the addition of $50 compensation for a final assessment, regardless of treatment completion status. However, post-treatment data collection rates were still lower than anticipated. In cases where follow-up data could not be obtained, missing data were treated conservatively using a last observation carried forward (LOCF) method from the last available data point.

In order to provide a comparison for the pilot results, the Hypnosis study was used as a comparison where possible. Prior to comparison testing, pre-treatment differences were assessed across the MI study and Hyp/SM+CPT conditions. Only one pre-treatment difference reached statistical significance (initial CAPS sleep severity, $p <$ .0001), such that MI +CPT participants reported a lower severity of sleep concerns than Hyp/SM+CPT participants. Additionally, some trends emerged on demographic differences between conditions (years of education, $p = .053$; marital status, $p = .075$; race, $p = .093$). Pre-treatment difference variables were assessed for associations with dependent variables for each hypothesis to insure that they did not have undue influence on study outcomes. Specifically significant associations of initial sleep disturbance severity, years of education, martial status, and race with dependent variables are noted by analysis. Pre-treatment differences were controlled when significantly associated with the DV. Specific analyses are outlined per study hypothesis.

Aim 1. Assess the ability of MI to influence ambivalence and RTC prior to CPT.

Hypothesis 1.   First, repeated measures MANOVAs of the MI sample were used

to test the hypothesis that MI participants would evidence increases in RTC (using

the URICA and MPSOCQ) during MI. A sample of 10, or 20 observations, was

estimated to provide 80% power for a large effect size (Cohen's $f = .50$). 1a) Data

were available for comparison with change in RTC over the Hypnosis preparatory

sessions Repeated measures MANOVAs were used to test the hypotheses that MI

would differentially increase RTC prior to CPT when compared to those receiving

a sleep-directed intervention (Hyp+CPT) or completing symptom monitoring

(SM+CPT) prior to CPT. A combined sample of 50 was estimated to provide

80% power to detect a medium to large effect size (Cohen's f = .35).

Hypothesis 2. A repeated measures MANOVA of the MI sample was also used to

test the hypothesis that the pros of therapy will increase and cons of therapy

would decrease over the course of the MI preparation sessions. A sample of 10,

or 20 observations, was estimated to provide 80% power for a large effect size

(Cohen's f = .50).

Hypothesis 3. Repeated measures MANOVA of the MI sample was used to test

the hypothesis that MI participants would evidence increases in CPT treatment

expectations during MI and decreases in fear of therapy. A sample of 10, or 20

observations, was estimated to provide 80% power for a large effect size (Cohen's

f = .50).

Aim 2. Investigate the utility of augmenting CPT with MI components

throughout the CPT protocol. It was anticipated that participants would display a range

in their need for MI augmentation during the CPT protocol and that MI would effectively

address fluctuations in readiness during CPT.

Hypothesis 4. We anticipated that participants would display a range of need for

MI techniques during the CPT protocol. Descriptive statistics were calculated to

demonstrate the use of MI during the course of CPT, including the sessions at

which MI was utilized, participant RTC at each CPT session, duration of the MI

intervention within the CPT session, and the reasons for MI skill usage.

Hypothesis 5. It was anticipated that the use of an MI intervention during a given

CPT session would produce an increase in RTC by the next CPT session (i.e., MI

would affect readiness when employed during CPT). Thus, it was hypothesized that participants would demonstrate change in RTC (URICA) following CPT sessions that employed MI components. Power analyses were limited as the number of CPT sessions utilizing MI was unknown. A sample of 25 sessions was estimated to provide 80% power for a medium effect size (Cohen's $f = .29$).

Aim 3. Assess the tolerability of MI+CPT and test the efficacy of the MI intervention to decrease dropout and increase engagement and treatment outcomes.

Hypothesis 6.   MI study participant therapy rating scores were assessed descriptively to ensure a high level of satisfaction with the overall MI+CPT intervention. MANOVA was then used to assess differences between MI+CPT participants and comparison groups on ratings of therapy satisfaction (6a). Power analysis for a between groups ANOVA with a sample of 50 participants would provide 80% power to detect a large difference between groups (Cohen's $f^2 = .16$). Finally, MI study participant feedback regarding the utility of MI augmentation was assessed descriptively and compared to written feedback to ensure high participant satisfaction with treatment.

Hypothesis 7.   Regarding overall treatment outcomes, the dropout rate of the pilot MI study was assessed arithmetically. 7a) Then, chi-square analysis was used to test the hypothesis that a higher percentage of participants who began MI+CPT would complete therapy than those who began CPT without MI (Hyp+CPT and SM+CPT). Chi square analysis allows for comparisons between unequal sample sizes. The current sample was estimated to provide relatively low power (approximately 40%), based on estimated proportions for dropout of 10%

(MI+CPT) and 25% (Hyp+CPT and SM+CPT)

(http://statpages.org/proppowr.html).

Hypothesis 8. Participant treatment engagement was assessed arithmetically

within the MI sample for treatment credibility, missed sessions, and homework

completion. 8a) A MANOVA was then used to test the hypothesis that MI

participants would demonstrate more treatment engagement than Hypnosis

participants (i.e., higher treatment credibility at session 1 of CPT, more consistent

therapy attendance during CPT, and better compliance with CPT homework). A

sample of 50 participants was estimated to provide 80% power to detect a large

difference between groups (Cohen's $f^2 = .15$).

Hypothesis 9. Finally, a repeated measures MANOVA was used to test change

on primary symptom measures (CAPS, PDS, and BDI-II) for MI+CPT

participants. Given the noted challenges in obtaining post-treatment data,

comparisons were limited to two time points (pre-treatment to follow-up), which

decreased the reliance on LOCF and most accurately represented the present data.

Moreover, numerous studies have observed consistent patterns of change

following trauma-focused treatment, such that participants demonstrate significant

change across treatment with maintenance of gains at follow-up (e.g., Galovski et

al., 2012; Resick et al., 2002). Thus, comparison of change from pre-treatment to

follow-up allowed for the testing of the initial hypothesis within the limitations of

the present data. Non-response rates (PTSD positive status at follow-up) were

also calculated for the MI+CPT sample. 9a) Next, repeated measures MANOVAs

were used to test the related hypothesis that MI treatment completers would

experience greater gains on primary symptom measures than individuals who completed CPT without MI. Power analysis for a between groups MANOVA with 3 groups and 2 repetitions indicated that 50 participants would provide approximately 80% power assuming a medium-range effect size (Cohen's $f = .26$) and a .20 correlation among measures (based on across time point correlations among outcome variables in the comparison sample of .10 for the CAPS and BDI-II for the .15).

H. Results

Study Sample

As noted above, the MI study ITT sample consisted of 17 women who were immediately enrolled into the MI+CPT condition. Demographic, trauma history, and initial symptom severity and RTC measures are presented below. The comparison Hypnosis ITT study sample ($N = 92$) included 48 Symptom Monitoring plus CPT (SM+CPT) participants and 44 sleep-directed Hypnosis Training plus CPT (Hyp+CPT) participants. MI and Hypnosis study sample comparisons are also described below and can be seen in Table 1.

Demographics. MI ITT participants ranged in age from 20 to 58 ($M = 34.47$, $SD = 11.78$). The group described themselves as predominantly White (76.47%), with Black (11.76%), Asian (5.88%), and other (5.88%) races accounting for approximately a quarter of the sample. A total of 11.76% described themselves as Hispanic. Marital status was approximately evenly divided across single (35.29%), married or living with someone (35.29%), and separated or divorced (29.41%) status. The majority reported at least

some post-high-school education (94.11%) and an annual household income of $20,000

or less (64.71%). No demographic differences emerged when MI+CPT participants were

compared to the two Hypnosis study conditions (SM+CPT and Hyp+CPT; see Table 1).

Although between group demographic differences did not reach significance, some trends

emerged. Specifically, years of education was marginally significant ($p = .053$). Post-

hoc Fisher's LSD analysis revealed that Hyp+CPT participants reported significantly

fewer years of education than SM+CPT participants ($p = .032$) and non-significantly

fewer years of education than MI+CPT participants ($p = .063$). Additionally, SM+CPT

participants were non-significantly more likely to be single than MI+CPT and Hyp+CPT

participants ($p = .075$) and the MI group had notably fewer non-White participants than

the Hyp+CPT and SM+CPT conditions ($p = .093$).

Trauma history. As can be seen in Table 1, MI ITT participants reported a

complex trauma history. Participants identified a worst event (or "index event") for the

assessment of PTSD and initial treatment focus. Index events in the MI ITT sample were

52.94% child sexual abuse, 11.76% child physical abuse, 29.41% adult sexual assault,

and 5.88% adult physical assault. Time since the index event ranged from 11 months to

54.19 years. No trauma type differences emerged between the MI and Hypnosis samples

on type of time since trauma, index event, or lifetime trauma history in the total sample.

Initial symptom and readiness ratings. Participants across MI and Hypnosis

study conditions reported similar pre-treatment symptom severity on the CAPS, PDS, and

BDI-II. Participants across conditions also endorsed similar pre-treatment levels on

measures of RTC (URICA and MPSOCQ). Participants were predominately in the

contemplation and preparation/action stages of change based on the URICA, with only

one participant per condition endorsing a pre-contemplation stage of change. As can be seen in Table 1, there was a single significant difference between conditions on initial sleep disturbance. Post-hoc analyses using Fisher's LSD revealed that, though still in the clinical range, MI+CPT participants reported significantly less sleep disturbance than either SM+CPT or Hyp+CPT participants. As noted above, significant and near significant differences were assessed for associations with DVs in all models and covaried when significant.

Aim 1

A primary aim of this study was to investigate the ability of MI to influence ambivalence and RTC prior to CPT. No participants dropped out during MI; however, given the higher than expected dropout rate during CPT (discussed below), follow-up analyses were also conducted per hypothesis to investigate potential interactions between treatment dropout status and change on these measures.

Hypothesis 1. Repeated measures MANOVAs were used to test the hypotheses that MI would increase RTC (i.e., decrease pre-contemplation and contemplation subscales and increase the preparation/action stage subscale) prior to CPT. This was first tested in the MI study sample. MANOVA results using the URICA subscales revealed a marginally significant effect of time which was associated with a large portion of the variance in change, $F(3, 14) = 3.48$, $p = .053$, $\eta^2_p = .41$, Achieved power = .48. Univariate analyses found non-significant results across tested subscales associated with small portions of the variance in change: Pre-contemplation $F(1, 16) = .06$, $p = .809$, $\eta^2_p = .00$, Achieved power = .48; Contemplation $F(1, 16) = 2.89$, $p = .109$, $\eta^2_p = .15$, Achieved power = .48; Preparation/action $F(1, 16) = .32$, $p = .580$, $\eta^2_p = .02$, Achieved

power = .46. Thus, it appears MI study participants demonstrated a large, marginally

significant (p = .053) change in RTC across the MI sessions, which was likely driven by

the overall pattern of multivariate change as no specific RTC subscales reached

significance. Figure 1 displays the overall RTC score for MI study participants across the

MI sessions for each MI participant by treatment completer status.

MANOVA results did not reveal a significant effect of time in the MI ITT sample

on the MPSOCQ, F (3, 14) = 1.15, p = .362, η^2_p = .20, Achieved power = .33. And

univariate analyses revealed non-significant results across tested subscales associated

with small portions of the variance in change: Pre-contemplation F (1, 16) = .63, p =

.439, η^2_p = .04, Achieved power = .41; Contemplation F (1, 16) = 2.93, p = .106, η^2_p =

.16, Achieved power = .36; Preparation/action F (1, 16) = .35, p = .564, η^2_p = .02,

Achieved power = .29. Completer results were nearly identical to ITT results for both

RTC measures, as only one participant did not complete the MI sessions. Thus, although

non-significant, all changes were in the expected direction, with the exception of an

increase in contemplation as measured by the MPSOCQ (see Table 2). Results indicate

that MI had a significant effect on RTC as measured by the URICA, but not the pilot

measure MPSOCQ, in the MI study sample.

1a) Repeated measures MANOVAs were also used to compare RTC changes in

the MI and Hypnosis study samples. Data were available for a subset of the ITT

comparison sample (SM+CPT n = 28 and Hyp+CPT n = 23) in addition to the ITT

MI+CPT sample (N = 17). MANCOVA results (including pre-treatment difference

variables) demonstrated significant change over the pre- to mid-treatment period, F (3,

60) = 5.95, p = .003, η^2_p = .21, Achieved power = .95, and the interaction effect of

time*treatment condition was marginally significant $F(6, 120) = 2.13$, $p = .055$, $\eta^2_p =$ .10, Achieved power $= .43$. Univariate results revealed significant effects of time on contemplation and preparation/action subscales ($p = .001$), with a trend on pre-contemplation ($p = .098$). No significant time*treatment condition univariate interactions emerged, again suggesting that the pattern of results (and not specific subscale changes) were different across conditions. The pattern of results in the completer sample was similar and is presented in Table 2. Post-hoc analyses were precluded by the use of MANCOVA; however, the raw means in Table 2 and estimated marginal means displayed in Figure 2 show change in expected directions across conditions with unique patterns of change across subscales in the three groups.

Multivariate results using the MPSOCQ in the ITT sample also demonstrated a significant effect of time, $F(3, 63) = 3.97$, $p = .012$, $\eta^2_p = .16$, Achieved power $= .96$, and a non-significant interaction effect of study condition, $F(6, 126) = .66$, $p = .682$, $\eta^2_p =$ .03, Achieved power $= .43$. However, the effect of time did not remained significant when controlling for pre-treatment difference variables using MANCOVA, $F(3, 60) =$ .98, $p = .402$, $\eta^2_p = .05$, Achieved power $= .96$. Nor was the interaction of time*condition significant in the ITT MANCOVA, $F(6, 120) = .55$, $p = .772$, $\eta^2_p = .03$, Achieved power $= .43$. Univarite results indicated a significant main effect of study condition on the action subscale of the MPSOCQ, but no time or time interaction effects were univariately significant in the final model. This pattern of results held in the treatment completer model (see Table 2). Figure 2 displays the estimated marginal means at pre- and mid-treatment for the three study conditions when including the pre-treatment difference covariates in the prep-treatment completer samples. Dropout status

was assessed for impact and was not significant in either the URICA or MPSOCQ

models for main or interaction effects, Fs (3, 47) = .41 to 1.26, ps = .299 to .745. In sum,

results of the MI pilot and Hypnosis comparison analyses revealed a pattern of change

over the pre- to mid-treatment period on the URICA, with possible unique change in the

MI condition. The MPSOCQ did not demonstrate significant change in the pilot or

comparison analyses.

Note: The remaining hypotheses were tested within the MI study sample only, as

Hypnosis participant data were not available for these measures.

Hypothesis 2. Repeated measures MANOVA of the MI sample were used to test

the hypotheses that the pros of therapy would increase and cons of therapy would

decrease over the course of the MI preparation sessions (from pre- to mid-treatment). No

significant differences were observed in change over time on pros or cons of therapy, F

(1, 13) = .26, p = .778, η^2_p = .04, Achieved power = .53, and there were no differences in

change on these measures by treatment status (i.e., CPT dropout versus CPT completer),

F (1, 13) = .22, p = .804, η^2_p = .03. Thus, dropout status did not appear to interact with

potential effects of MI on change in pros and cons of change over the course of MI.

Hypothesis 3. Views of CPT and fear of beginning CPT also did not show

significantly multivariate change over the course of the three MI prep sessions, F (5, 10)

= 1.22, p = .368, η^2_p = .38, Achieved power = .49. However, it is noteworthy that power

was limited and time accounted for 38% of the variance in change in treatment

expectations and fear of treatment. Univariate results revealed small to moderate

associations between time and change in views and fear of treatment (η^2_p = .06 to .13).

Moreover, there was large, but non-significant interaction effect between time and

treatment completer status, $F(5, 9) = 2.17$, $p = .147$, $\eta^2_p = .55$. Specifically, univariate

results revealed that those who went on to complete CPT rated CPT as seeming more

logical after MI (at mid-treatment), whereas those who went on to dropout rated it as

seeming less logical than at the first MI session, $F(1, 13) = 8.39$, $p = .013$, $\eta^2_p = .39$.

Similarly, those who completed treatment evidenced a non-significant decrease in fear

over the MI sessions (see Figure 3). These findings indicate that participants may have

responded differently to the MI intervention, such that those who went on to complete

treatment increased their confidence in CPT following MI. These results are highly

tentative given the small sample size and non-statistically significant multivariate results.

Aim 2

A secondary aim of this study was to investigate the utility of augmenting CPT

with MI components throughout the CPT protocol.

Hypothesis 4. As anticipated, participants displayed a range of need for MI

techniques during the CPT protocol. MI interventions were implemented when

participants verbalized or demonstrated ambivalence (e.g., avoidance of therapy or home

practice assignments). Use of MI style during CPT reflected a balance of the MI

components: empathizing with and normalizing ambivalence, rolling with resistance,

developing discrepancy, and supporting self-efficacy. For participants who completed at

least 9 CPT sessions, MI elements were employed in an average of 2.40 sessions ($SD =$

1.90, Median = 2), with a wide variety among cases regarding frequency of MI usage

within CPT (range = 0 to 6). There was also a broad range in timing of MI integration,

with MI being employed across almost the full span of CPT sessions (1 to 10) across

cases. However, MI was most often employed at session 4 -- the session following the

assignment of the trauma account. MI was typically employed briefly in MI sessions where it was utilized (~5 minutes or less), but in 6 instances, MI was used as a more central intervention to address ambivalence during the course of a CPT session.

Although RTC measures were not utilized to determine use of MI in session, MANOVA was used to assess self-reported RTC at sessions where MI was and was not employed. Multivariate tests were not significant, $F(8, 125) = 1.61$, $p = .129$, $\eta^2_p = .09$, Achieved power = .99. However, univariate results revealed that during CPT sessions where MI was employed, participants reported significantly higher contemplation on the SOC, $F(1, 133) = 4.81$, $p = .030$, $\eta^2_p = .04$, Achieved power = .99, and marginally significantly higher pre-contemplation on the URICA, $F(1, 133) = 3.54$, $p = .062$, $\eta^2_p = .03$, Achieved power = .99, than at sessions where MI was not utilized.

Hypothesis 5. A repeated measures MANOVA was used to test the hypothesis that participants would demonstrate increases in RTC following the use of MI interventions during CPT sessions. MANOVA did not find significant change on RTC subscales, as measured by the URICA, immediately following sessions when MI was implemented, $F(12, 82) = .88$, $p = .570$, $\eta^2_p = .11$, Achieved power = .99. Said another way, there was no immediate change in RTC observed between the CPT session in which MI was used and RTC at the next CPT session. Figure 4 displays the session by session change in URICA RTC subscales for the four highest users of MI during CPT. Visual inspection shows change in RTC subscales following MI interventions to varying degrees for each participant.

Aim 3

The final aim of the current study was to test the tolerability of MI+CPT and the

efficacy of the MI intervention to decrease dropout and enhance treatment engagement and primary symptom outcomes.

Hypothesis 6. The tolerability of the MI intervention and participant ratings of the overall MI+CPT intervention were assessed in multiple ways. First, we reviewed MI study participants' satisfaction ratings with the overall therapy (MI+CPT). MI study ITT participants reported high satisfaction with the study therapist ($M = 9.38$ of 10, SD = .99) and moderate to high satisfaction with the therapy ($M = 7.58$ of 10, SD = 2.40). 6a) Overall therapy satisfaction ratings were also compared to Hypnosis study participants' ratings of treatment. As anticipated, there were no statistically significant differences on ratings of satisfaction with therapist, treatment, or study condition by therapy condition when MI+CPT ITT participants were compared to SM/Hyp+CPT ITT participants, F (8, 132) = 1.32, p = .241, η^2_p = .07, Achieved power = .99. Of note, there was a main effect of dropout status across conditions, such that dropouts were less satisfied with treatment than completers, F (4, 63) = 2.77, p = .035, η^2_p = .15, Achieved power = .99. Univariate analyses indicated that dropout participants across conditions were significantly less satisfied with treatment, F (1, 71) = 10.67, p = .002, η^2_p = .14, Achieved power = .73, but not with their therapist, F (1, 71) = 1.11, p = .296, η^2_p = .02, Achieved power = .73, than completers. In all, satisfaction with treatment, therapist, and condition was high in the MI pilot study and was similar across treatment studies, indicating that MI+CPT was similarly well tolerated.

Next, MI participant feedback regarding the utility of MI augmentation was assessed based on an anonymous self-report measure and written feedback administered at follow-up assessments. Participants endorsed mixed, though largely positive, reactions

to the initial prep sessions. Those who completed treatment reported that they found the prep sessions to be "very" logical ($M = 8.17$ of 9, $SD = .98$) and "very" helpful ($M = 8.83$ of 9, $SD = .41$). Only two participants who terminated treatment completed follow up assessments. These women reported significantly different reactions to the prep sessions (and the treatment overall), $F(5, 1) = 601.09$, $p = .031$, $\eta^2_p = 1.00$, Achieved power = .08. Dropouts reported that they found prep-sessions to be "somewhat" logical ($M = 4.5$, $SD = 3.54$) and "very little" helpful ($M = 3.50$, $SD = 2.12$). A similar breakdown was observed in the self-reported utilization of prep sessions in later treatment. Treatment completers reported that they "often" drew on prep sessions in treatment ($M = 4.20$ of 5, $SD = .45$) and found that prep sessions helped them to stay motivated in treatment "somewhat" to "a good deal" ($M = 3.60$ of 5, $SD = 1.14$). The two women who terminated prematurely reported that they drew on prep sessions "a little" to "somewhat" in treatment ($M = 2.50$, $SD = .71$) and found that prep sessions helped them to stay motivated in treatment "somewhat" ($M = 3.00$, $SD = 1.41$). It is noteworthy that only 2 of 8 dropouts completed a follow-up assessment, but that those women also reported that they used MI less during treatment than CPT completers and found MI to be less logical and less helpful.

Given the low number of follow-up assessments completed by MI dropouts, participant reactions at the first CPT session were also reviewed. At that time, participants who went on to drop out did not endorse significantly different views of treatment than individuals who went on to complete treatment, $F(7, 8) = .38$, $p = .891$, $\eta^2_p = .25$, Achieved power = .14. Univariate analyses also revealed no significant differences between groups on treatment ratings at CPT session 1. Thus, participants did

not differ on their reported views of treatment early in treatment, but at follow-up,

women who completed treatment reported MI, and treatment overall, to be more helpful

than those who did not complete treatment.

When asked to describe their reactions to the first three preparation sessions,

participants reported:

"They gave me a sense of where we were headed, which helped me feel in control. It also helped knowing there were logical specific steps, not just talking aimlessly."

"At first I didn't understand why there was prep sessions or talk about the cons of change. But this allowed for me to be prepared for a lot of the cons. They made me motivated to keep coming back."

"I was confused about the purpose. It was a little scary because I thought it meant it was going to be really hard."

"Made me hopeful and helped me to clarify for myself why exactly I want to get better."

When asked to describe the impact that drawing on prep sessions during later

treatment had on their therapy experiences, participants reported:

"When we identified the cons of changing and the pros in the prep sessions, it motivated me by showing how it would be better to change and be prepared for change than staying the same. It gave me goals to work towards."

"It gave me more confidence. It meant I had visible ways of seeing my own improvement."

"I looked back at the worksheets and notes of those first sessions when the treatment continued."

Participant responses demonstrate a range of experiences with the MI prep

sessions. Respondents describe the sessions as helping them to feel "motivated",

"hopeful", and "in control". They also note drawing on MI work, including their goals

and confidence, during CPT. However, participants also noted feeling "confused" at first

by the prep sessions. Unfortunately, study dropouts did not provide written reactions to

the MI sessions. Thus, the current data cannot speak to the qualitative experience of

women who did not complete treatment.

Hypothesis 7. Finally, traditional psychotherapy outcomes were assessed in the MI pilot sample. Descriptive statistics revealed a high dropout rate in the MI study over the course of the trial, such that 8 of 17 women terminated therapy (MI or CPT) prematurely (47.06%). This rate was high in comparison to the established literature (see Table 3). Interestingly, no participants dropped out of treatment during the course of MI. One participant never initiated treatment (the only participant who was in the pre-contemplation stage at pre-treatment). All other participants, even those who were later removed from analyses for meeting exclusion criteria, completed MI. Dropouts in the MI study prematurely terminated from CPT between sessions 1 and 9 (3 at session 1, 1 at session 3, 2 at session 5, and 1 at session 9).

7a) Chi-square analysis indicated the MI study dropout rate was not statistically different from the Hypnosis study conditions, wherein 23 of 48 SM+CPT participants (47.92%) and 18 of 44 Hyp+CPT participants (40.91%) dropped out prematurely from therapy (see Table 4). Regarding average number of CPT sessions completed prior to dropout, MI participants did not differ from SM+CPT participants; however, Hyp+CPT participants differed from both comparison groups, such that they were significantly more likely never to attend a single CPT session (see Table 4).

Hypothesis 8. MI study participants demonstrated good, but varying engagement on process measures. Figure 5 displays the mean minutes of daily homework for participants in the MI study by treatment completer status across CPT sessions. A visual analysis shows a broad range of engagement in homework in both the treatment dropout and completer groups. Participants also varied in other potential markers of treatment engagement, including their views of treatment and the number of sessions missed during

the CPT protocol (see Table 4).

8a) Next, we tested the hypothesis that MI participants would demonstrate more engagement on process measures related to ambivalence than participants in the Hypnosis study, who did not receive MI. As can be seen in Table 4, there was no difference across conditions on number of sessions missed during CPT (for completers) or on average CPT homework engagement. However, participants did vary in their treatment expectations across conditions, $F(8, 158) = 2.42$, $p = .017$, $\eta^2_p = .11$, Achieved power = .63. No univariate differences on specific views of treatment reached significance, suggesting that participants across conditions varied in their pattern of treatment expectation (see Table 5). Contrary to hypotheses SM+CPT participants appeared to be non-significantly higher on the view of CPT as logical at CPT session 1, whereas MI+CPT participants were non-significantly higher on the view that they would recommend this treatment to a friend. These results are considered tentative given the limited power and non-statistically significant univariate results, but may indicate differential treatment credibility following different preparatory treatment experiences.

Hypothesis 9. Finally, repeated measures MANOVAs were used to assess gains between pre-treatment and follow-up on primary symptom measures (CAPS, PDS, and BDI-II). First, a MANOVA of the ITT MI+CPT sample revealed a strong and significant effect of time from pre-treatment to follow-up, $F(3, 14) = 10.26$, $p = .001$, $\eta^2_p = .69$, Achieved power = .49. Univariate analyses also demonstrated a large and significant effect of time across measures (η^2_p: CAPS = .63; PDS = .40; BDI-II = .43). Consistently, the MI+CPT completer sample revealed a strong and significant effect of time from pre-treatment to follow-up, $F(3, 6) = 5.38$, $p = .039$, $\eta^2_p = .73$, Achieved power = .26, with a

slightly larger effect of time across univariate measures (η^2_p: CAPS = .68; PDS = .54;

BDI-II = .48). Regarding diagnostic status, 8 of 17 MI+CPT ITT participants (47.06%)

and 3 out of 9 MI+CPT treatment completers (33.33%) remained PTSD positive at

follow-up. Of note, LOCF was used for a single missing MI+CPT completer and for 6 of

8 MI dropouts who did not complete follow-up assessments, drawing on final session

PDS and BDI-II and pre- or mid-treatment CAPS scores as available. These results

demonstrate that the MI+CPT intervention effectively reduced primary symptoms of

PTSD and depression. As expected, results were more robust for treatment completers

and non-response rates were consistent with the broader literature (see Table 3).

9a) Repeated measures MANOVAs were then used across conditions to test the

hypothesis that MI+CPT participants would experience greater gains between pre-

treatment and follow-up on primary symptom measures than individuals who completed

CPT without MI (i.e., Hypnosis study participants). ITT MANOVA revealed a

significant effect of time across conditions, $F(3, 104) = 41.98$, $p < .0001$, $\eta^2_p = .55$,

Achieved power = .99. Univariate analyses demonstrated a large and significant effect of

time across conditions for all measures (η^2_p: CAPS = .55; PDS = .42; BDI-II = .38).

Contrary to hypotheses, participants did not appear to change differentially across

conditions, such that the time*condition interaction effect was not statistically different

and was associated with a small effect size, $F(6, 208) = .84$, $p = .541$, $\eta^2_p = .02$,

Achieved power = .63. Univariate tests revealed that each of the primary outcome

measures was associated with a small and non-significant interaction effect (η^2_p: CAPS =

.01; PDS = .01; BDI-II = .02). PTSD diagnostic status was also assessed at follow-up.

ITT completers evidenced a high non-response rate across samples (MI+CPT = 47.06%,

SM+CPT = 39.58%, Hyp+CPT = 43.18%), with a non-significant between groups

difference, χ^2 (1, N = 109) = .32, p = .854, Cramer's V = .05, Achieved power = .81.

Completer results revealed a similar picture (see Table 6). All Hypnosis study

completers completed at least one post-treatment assessment (25 SM+CPT and 26

Hyp+CPT) and all but 1 of 9 MI+CPT completed a post-treatment assessment. No pre-

treatment differences were associated with DVs. MANOVA again revealed a significant

effect of time across conditions, such that participants across conditions demonstrated

clinically significant gains on all primary symptom measures. Again, contrary to

hypotheses, participants did not appear to change differentially across conditions, such

that the time*condition interaction effect was not statistically different and was

associated with a small effect size. Thus, all those who completed treatment, regardless

of condition, experienced similar gains. Regarding diagnostic status, the MI study non-

response rate for treatment completers (33.33%) was non-significantly higher than the

SM+CPT (8.00%) and Hyp+CPT (19.23%) treatment completer non-response rates, χ^2

(2, N = 60) = 3.26, p = .194, Cramer's V = .23, Achieved power = .54. Taken together

with the MI study pilot results, the comparison Hypnosis analyses revealed that MI study

participants experienced significant and meaningful change in primary symptoms over

the study period, but did not show enhanced change as compared to participants in the

Hypnosis study conditions.

I. Discussion

This pilot study aimed to assess the augmentation of Cognitive Processing

Therapy (CPT) with three preparatory sessions of Motivational Interviewing (MI), to

decrease dropout and non-response by decreasing ambivalence and increasing readiness

to change, before and during trauma-focused treatment. First and foremost, the pilot

nature of the current study cannot be overstated. Statistical power was limited by the

pilot sample size. However, these analyses were consistent with several recent pilot trials

(Constantino et al., 2008; Tuerk et al., 2010) and are hoped to provide valuable

preliminary data to the literature. Every effort was made to maximize the strengths of the

current study and to account for statistical power limitations. The use of effect sizes is in

line with recent pilot trials and is proposed to be a better estimate of change in limited

samples (Constantino et al., 2008). Toward this end, current data analyses incorporated

tests of statistical significance as well as consideration of achieved power and effect sizes

in an effort to best represent study data.

This study represents the first empirical investigation of MI used in an individual

format as an augmentation for trauma-focused treatment. Several important results

emerged from these pilot data that may be meaningful for future research and for clinical

practice. First, even among this treatment-seeking sample, participants presented for

treatment with a range of readiness to change (RTC). Second, the MI intervention

appeared to be well tolerated within the pilot sample. It is particularly noteworthy that all

participants who began MI completed MI, indicating that the preparatory sessions were

well tolerated in the pilot sample. Moreover, CPT treatment completers evaluated the MI

sessions as helpful and indicated that they drew on preparatory work for motivation

during treatment. Third, broadly speaking, MI produced the anticipated associations with

changes on RTC. This result was not as robust as anticipated, but provides initial

evidence that readiness does increase with MI for trauma-survivors. Fourth, as

anticipated, participants evidenced unique trajectories of ambivalence throughout treatment. MI was utilized throughout the CPT protocol across cases. Yet, although clinically useful, MI did not produce immediate effects on RTC when implemented within CPT. Moreover, MI was not associated with lower dropout or increased engagement or symptom outcomes. We will consider these points in turn within the context of the comparison results and broader treatment literature.

Influence of MI on RTC measures

The primary aim of this study was to investigate the ability of MI to influence ambivalence and RTC prior to CPT. As anticipated, MI pilot participants evidenced change over time on the established RTC measure (URICA). However, contrary to expectations, Hypnosis comparison analyses also revealed a pattern of change over the pre- to mid-treatment period on the URICA. This finding indicates that MI did not have a robust differential effect on RTC. This unexpected result may reflect the sheer impact of becoming involved in treatment, which is in itself taking action toward change, and/or the effect of treatment on RTC. For example, it is possible that individuals in all conditions increased in RTC due to increases in hope following assessment. Similarly, participants may have experienced increases in self-efficacy with progress during sleep directed hypnosis training in the Hyp+CPT condition or with symptom monitoring in the SM+CPT condition, which has been noted to produce amelioration of PTSD symptoms in previous studies (Galovski et al., 2012). Thus, although pilot participants did evidence change in RTC over the preparatory sessions, it appears this effect may not have been unique to the MI intervention.

Although counter to predictions, the finding that MI may not have had a unique

effect on RTC is consistent with limited previous studies in the anxiety disorders.

Murphy et al. (2009) also did not find differential change on the URICA between MI and

psychoeducation-based treatments in their PTSD-positive veteran sample. Their study

did not report change over time across conditions, so it remains unknown if those

interventions were associated with change over time on RTC. Only one other study has

measured pre- to post-intervention change in a PTSD-positive sample. Rooney et al.'s

(2005) treatment study did not find change in RTC (using the URICA) or in the pros and

cons of change following a 2-day psychoeducation-based preparation group with

veterans. However, the duration may have been too brief to detect meaningful changes.

Interestingly, they found that individuals increased on RTC over the course of trauma-

focused treatment, again supporting the hypothesis that RTC may also be impacted by

change-oriented interventions. Taken together with the current results, previous studies

support a non-specific effect of treatment on RTC. Given the limitations to these initial

trials, it remains difficult to draw firm conclusions regarding the impact of MI

interventions on RTC. Yet, thus far, MI has not demonstrated robust differential change

on RTC prior to CBTs for PTSD as compared to non-MI interventions. Future study is

needed to assess the impact of other interventions on RTC, possibly through theoretically

related mechanisms (e.g., increase in self-efficacy via symptoms change in related

preparatory interventions or trust in the therapist, etc.). It is also important to consider

the high RTC of participants in the current trial and comparison conditions, each of

which had only a single participant in the pre-contemplation phase. The current results

may not generalize to populations with lower RTC for PTSD (e.g., substance use

treatment programs, primary care, domestic violence shelters, etc.), in which case MI

may have a unique impact on enhancing readiness.

Interestingly, views of CPT changed for a subset of the MI sample. Specifically, those who went on to complete treatment demonstrated a significant difference in the view of CPT as logical following MI as compared those who did not go on to complete CPT. Other views of treatment and fear of treatment also demonstrated a differential pattern of change between those who went on to complete CPT and those who did not, but did not reach significance and suffered from low statistical power. Moreover views and fear of treatment demonstrated large but non-significant change over the course of the MI sessions ($p = .368$, $\eta^2_p = .38$). The issue of why participants may have evidenced differential change will be considered further below. Thus, although the finding of change in views and fear of treatment are tentative, they are consistent with previous studies. Specifically, Tolin and Maltby's (2008) study with treatment refusing OCD participants indicated that change in fear of treatment was the only significant predictor of entrance into therapy in their sample. Similarly, Westra et al. (2006) reported that increasing treatment expectations were a significant predictor of homework compliance, which predicted treatment outcomes in their mixed anxiety sample. These results indicate that treatment expectations, or credibility, and fear of treatment may be important markers for dropout, and support that these markers may be amenable to change using MI. These markers are easy to assess, measured by five total items in the present sample, and thus could make a useful clinical tool if these tentative results are replicated. Future research is needed to replicate these results.

CPT Augmentation

A secondary aim of this study was to investigate the utility of augmenting CPT

with MI components throughout the CPT protocol. MI was used for nearly all participants at some point during the CPT intervention, with six instances in which MI was a more primary intervention (> 5 minutes). MI was utilized at times when participants voiced ambivalence regarding treatment, typically either regarding coming to sessions or completing home practice. Although the determination to MI use within CPT was made based upon clinical considerations, the results supported that participants reported significantly higher contemplation on the SOC marginally significantly higher pre-contemplation on the URICA at sessions where MI was utilized as opposed to at sessions when it was not utilized. This finding lends some support to the ability of RTC measures to assess within session change; however, these measures are not clinically useful markers of ambivalence during the session, as they require specific scoring of over 30 items.

Despite the perceived clinical utility for the augmentation of CPT with MI elements, there were no significant changes in measures of RTC following MI use during CPT. It is possible that available RTC measures, which were not designed to assess such small scale fluctuations in ambivalence, may not be the best indicator of the successful use of MI during CPT. This is tentatively supported by the lack of robust differences in RTC scores between sessions where the MI therapist observed ambivalence. Moreover, it is possible that MI utilization during CPT had a smaller or less direct effect on RTC, which was not detectable in the current analyses. Future research could usefully target both more easily readable session-by-session ambivalence/RTC measures, as well as the ways in which therapists address ambivalence in session with MI or other therapeutic tools.

Attrition, Engagement, and Treatment Outcomes

The final aim of the current study was to assess the tolerability of MI+CPT and to test the overall efficacy of the MI+CPT intervention on conventional trauma-focused treatment outcomes, dropout and treatment engagement and primary symptom outcomes. As noted, the MI pilot intervention appears to have been well tolerated by those who completed treatment. Moreover, study participants also indicated that they found the prep sessions to be very helpful and reflected that information gathered during the MI sessions helped maintain motivation during the trauma-focused work. Many participants indicated that the MI sessions allowed them to clarify goals and "get motivated" for treatment. Despite extensive outreach efforts and the addition of compensation for a final assessment, only two women completed follow-ups after dropping out of the study. Those two women provided limited information regarding their experience of treatment, but did report lower satisfaction with the therapy than treatment completers. As such, the current data cannot speak to the overall tolerability of the MI plus CPT intervention as experienced by those who did not to complete treatment. It is noteworthy that all participants who began MI completed the MI preparatory sessions and that participant who went on to dropout rated the intervention similarly following the MI sessions, again indicating tolerability of the preparatory intervention. However, like those who terminated prematurely from the Hypnosis study, MI study participants who later dropped out of CPT indicated that they were less satisfied with therapy at follow-up. This is an important consideration given the larger than expected dropout rate in the pilot study. It is possible that the addition of MI to the CPT protocol had differential effectiveness for survivors (e.g., depending upon initial RTC, primary symptom

presentation, etc.), which may be a fruitful area of research for future study.

Regarding dropout, the use of MI did not appear to reduce dropout in the present sample, which had an observed dropout rate of 47.06%. The finding that all participants who began MI completed the MI preparatory sessions indicates that MI was well tolerated, but was not associated with increased CPT completion. When looking at the broader literature, the MI study dropout rate was at the high end of all active treatments, which average around 18% (Imel et al., 2013) and range from 0 to 54% (Schottenbauer et al., 2008). This range is similar when reviewing prior CPT studies, which reported dropout rates ranging from 26.79% (Resick et al., 2002) to 44.57% in the Hypnosis study (Galovski, Elwood, Blain, & Mott, In preparation). Taken together, even considering the limited statistical power produced by the smaller MI sample size, it is clear that MI did not improve upon observed dropout rates in the current study.

Similarly, MI study participants demonstrated good engagement during treatment, but did not evidence more treatment engagement on process measures (including homework completion and session attendance), than individuals in the comparison Hypnosis study. One exception was noted, such that MI participants indicated they would be more likely to recommend CPT to a friend than Hypnosis study participants. This item has been found to be a reliable indicator of treatment credibility in the literature (Borkovec & Nau, 1972). There was limited evidence that MI may have had some impact on views of treatment (i.e., being more likely to recommend CPT to a friend) as compared to Hypnosis study completers (above), but non-significant evidence that MI had an overall impact on treatment expectations during the preparation sessions. As discussed, CPT treatment completers evidenced differential change across MI on views

of CPT as logical from those who went to dropout, but it is unclear why dropouts did not evidence similar increases in expectations. Moreover, no comparison data regarding treatment expectations was available for the Hypnosis study conditions at pre-treatment. Thus, it remains possible other active and control treatments may have a similar effect on enhancing credibility, which is supported by the evidence that participants in non-MI conditions also evidenced change in RTC over the pre-treatment period.

Although MI+CPT participants evidenced significant gains on symptom outcomes acoss CPT, contrary to hypotheses, MI study participants had largely equivalent outcomes to Hypnosis study completers and to PTSD outcomes in the broader literature. Specifically, symptom outcomes were not statistically different between the two studies, with participants across samples evidencing improvement on clinician and self-rated PTSD symptoms and on self-rated depressive symptoms. Regarding the broader literature, Schottenbauer et al. (2008) reviewed 55 studies and reported a range of non-response rates (i.e., PTSD positive diagnostic status). Specifically, looking at 3-month follow-up after active individual-format trauma-focused treatments, PTSD positive rates ranged from 4.00% (Galovski et al., 2012) to 45.00% (Foa et al., 1991). Thus, the MI study PTSD positive rate at follow-up (33.33%) is within range of previous samples of active, trauma-focused, individual format treatments. This was statistically similar with non-response rates found in the overall Hypnosis study and comparable to other trials that tests individual CPT used with female sexual assault survivors. Such studies reflected the range of response rates found in the broader PTSD treatment response literature, from 16.20% of treatment completers PTSD positive at 3-month follow-up (Resick et al., 2002) to 25.9% of the ITT sample PTSD positive at 6-month

follow-up (Resick, Galovski et al., 2008). Overall, the MI study results show a remarkably similar profile to the broader trauma-focused treatment literature. Statistical power is a crucial consideration given the limited sample size. It remains possible that MI produced a smaller, non-detectable effect on expectations and engagement in the current sample, which may be evidenced by participant ratings of confidence in the treatment, such that they would be more likely to recommend it to a friend. It can only be concluded that MI did not produce a large effect on treatment expectations or engagement or on symptom and diagnostic outcomes as currently tested. Before considering the limitations and implications of these findings, it is also relevant to consider the current results in the context of prior studies that have used MI as a preparation to CBT for anxiety.

Comparison to the Existing MI for Anxiety Literature

The current results stand apart from some findings in the previous literature of MI as a preparation for CBT. A single study of PTSD-positive male combat veterans who attended an MI-based group reported that MI participants attended more total group sessions and attended the yearlong program for longer than veterans who received psychoeducation (Murphy et al., 2009). However, Murphy et al.'s study provides a limited comparison to the current trial, as it was conducted in the second month of a yearlong group-based treatment program. Additionally, their study did not measure PTSD treatment outcomes, thus the nature of continued treatment engagement cannot be concluded (e.g., participants may have remained symptomatic longer than in the control condition). The present result of a non-significant increase in dropout also runs counter to previous findings in two studies by Westra et al., which found equivalent (2009) and

substantially decreased (2006) dropout rates for MI+CBT as compared to WL+CBT. Moreover, Westra and colleagues' studies indicated an increase on homework compliance (i.e., engagement) and participant expectations of their ability to master symptoms. Neither of these results was replicated in the current study. It is noteworthy that the current MI study's dropout rates were larger than in Westra et al.'s trials (2006: 16% MI+CBT vs. 37% WL+CBT; 2009: 10.53% MI+CBT vs. 15.79% WL+CBT). This difference could be attributable to many factors, including demographic differences between predominantly low SES individuals in St. Louis city in the current study and individuals who had access to a Toronto suburb without public transportation noted in Westra et al.'s (2009) study. Additionally, Westra et al. targeted mixed anxiety disorders (no primary PTSD; 2006) and GAD in their latter study (2009). The current literature is too limited to produce firm conclusions, but indicates that future study could explore the impact of target diagnosis on the effectiveness of the MI preparatory interventions.

The findings that MI preparatory sessions in the current study did not improve dropout rates nor overall treatment engagement or primary symptom outcomes thus run counter to both initial findings in the anxiety disorders literature and to the broader MI literature, and warrant careful consideration. No study to date has tested the effects of an MI-based intervention in a sample of PTSD-positive civilians or as a preparation for individual trauma-focused treatment. Thus, these pilot MI outcomes in this specific population are without a true comparison in the literature. Individuals in the current study evidenced mixed readiness to change at pre-treatment, but were actively treatment seeking and were largely in the contemplation and preparation/action stages of change. In fact, the one participant who scored in the pre-contemplation stage at pre-treatment

dropped out before beginning MI. The MI literature speaks directly to the issue that MI

should be used to target ambivalence (Miller & Rollnick, 2012), which was not as

prevalent in the current sample of treatment-seeking individuals. Thus, it is possible that

using MI within a high-readiness, treatment-seeking sample is an ill fit, and perhaps that

MI even had a paradoxical effect for some participants who already established

motivation. Clinically speaking, many trauma therapists would also advise a "strike

while the iron is hot" approach to capitalize on survivors' willingness to change. Thus,

the current study's approach may thus have run counter to the general wisdom of both MI

and trauma clinicians.

By comparison, Westra et al. (2006) also drew from clinic treatment referrals and

reported a higher rate of dropout than in their 2009 study, which recruited using

advertisements for individuals who "worry excessively". Their studies did not employ an

RTC measure, so fit with initial stage of change cannot be estimated. Similarly, Murphy

et al. (2009) did not report initial stage of change or RTC within their veteran sample, so

comparisons cannot be drawn. Moreover, veteran samples are also subject to secondary

gain issues related to service connected compensation, and thus, may not provide a fitting

comparison to civilian populations in general. Interestingly, a recent study using an MI-

based intervention with treatment rejecting OCD participants found promising results,

such that their MI-based intervention demonstrated clinical significance in increasing

entrance and completion into CBT for OCD (Tolin & Maltby, 2008). This latter study

may also point to the importance of matching interventions to clinical need and

presentation. Given the limited nature of the literature regarding MI as a preparatory

treatment for CBTs for anxiety, conclusions are highly tentative, but suggest

consideration of the potential moderational effects of initial RTC and treatment seeking status on MI preparatory interventions. Further research is needed to determine both the replicability of the current pilot results, as well as the potential effectiveness of MI within anxiety disorder treatment samples of varying RTC.

Summary, Limitations, and Clinical Considerations

Generally speaking, the current study produced limited support the proposed hypotheses. Specifically, MI participants did evidence expected changes in RTC over the course of MI, but Hypnosis comparison participants also evidenced change in the expected directions. Similarly, there was limited evidence that MI may have had some differential impact on views of treatment, as compared to Hypnosis study completers, and that views of treatment changed over the course of MI for treatment completers. But there was no significant evidence that MI had an overall impact on treatment expectations, pros and cons of treatment, or fear of treatment during the preparation sessions in the full sample. Additionally, although MI was utilized at varying points in the CPT protocol to address perceived ambivalence, participants did not evidence increases in RTC following sessions where MI was used. Finally, MI did not appear to decrease dropout or increase treatment outcomes in the current sample. Thus, MI appears to have increased RTC and some views of treatment, but may not have had unique effects on these outcomes compared to other treatments. As discussed above, the treatment seeking nature and relatively high RTC of the pilot sample may have limited the impact of the MI intervention in the current study. For example, it is likely that these results would have been different in a setting with individuals with lower expressed RTC. This factor could also, at least partially, account for discrepant results from previous samples

employing MI prior to CBT for anxiety disorders, which did not report initial RTC.

This study represents the first investigation of MI prior to CBT for PTSD in an individual format and the first study of an MI-based intervention in a non-combat sample. Moreover, only a handful of studies to date have investigated the use of MI for any anxiety disorder. As such, it is hoped that the current results will add to the growing body of literature on MI interventions. There are, however, several important limitations to the current study. Most notably, this study is limited by the nature of the pilot trial. As such, multiple analyses were subject to low statistical power, and may have been underpowered to detect small to medium effects. Second, the current study lacks a randomized comparison sample. The use of a closely related comparison sample and the location of the current results with the extant literature, where available, is hoped to help address this concerns; however, a non-randomized control sample, collected at overlapping, but non-equivalent time periods does not fully address threats to internal validity. Additionally, the generalizability of this pilot sample is an important consideration. The inclusion of only female assault survivors reduces the generalizability of the findings to a smaller sub-sample of trauma survivors. However, as noted, this sub-sample of PTSD-positive individuals has not been previously studied regarding MI. Finally, the setting of the current study represents another important consideration. Women enrolled in the current sample were treatment-seeking, and thus, may already have had higher motivation for change. As such, the effects of MI may be different in settings where individuals present as less expressly ready to address PTSD.

Other methodological considerations may have impacted the current results and warrants clinical consideration. First, meta-analytic research on MI indicated lower

effect sizes for manual-guided MI studies versus studies that did not report manual use (Hettema et al., 2005). Thus, the fixed three-session structure and use of a flexible protocol for standardization in the present study may have impacted outcomes. However, all participants who began MI completed the MI portion of the protocol and many who went on to complete treatment reported that the prep sessions helped them to stay motivated and to clarify their treatment goals. Moreover, the current MI protocol was based upon Westra and colleague's protocol (Westra & Dozois, 2003), which, as reviewed, produced effects on treatment engagement and outcomes in their previous studies. Thus, it is unlikely that this approach alone can account for the difference with hypothesized outcomes. It is worth considering how a more flexible approach could be utilized in clinical care (e.g., responsive to the needs of the individual client); however, the current data cannot speak to these outcomes. Similarly, it could be argued that compensation motivated individuals to complete treatment in the comparison Hypnosis study. However, many studies with compensation reported very high dropout rates (Schottenbauer et al., 2008), and all studies which reported payment procedures noted that individuals were compensated for assessments regardless of treatment completion. Thus, there was no extra incentive for Hypnosis study or other study participants in the broader literature to complete treatment to attain compensation. Additionally, Westra et al.'s (2006, 2009) MI-based preparatory treatments did not include direct compensation and saw some differential dropout, engagement, and symptom outcomes following MI+CBT, which the current study did not replicate. Here again, this specific methodological point likely does not fully account for the discrepancies from the study hypotheses.

It is also possible that the novice MI status of the study therapist had bearing on the current results. The study therapist reviewed the MI literature in depth, completed online and video-based training, received specific MI training from a national Motivational Interview Network of Trainers (MINT)-certified trainer, and received supervision to ensure the delivery of adherent and competent MI treatment. The literature speaks to the efficacy of brief multi-method training as an empirically supported mode of training for MI (Martino, Canning-Ball, Carroll, & Rounsaville, 2011; Young & Hagedorn, 2012) and indicates that the use of follow-up consultation enhances clinical skill in MI style (Smith et al., 2007). Moreover, although the novice MI status of the therapist introduces a potential threat to internal validity, it increases generalizability of the study, as it is unlikely that the majority of trauma-focused therapists seeking to use preparatory treatments will be seasoned experts in the use of MI. It is also noteworthy that the MI study therapist achieved relatively low dropout rates in two prior RCTs (15.38%, Galovski et al., 2012; 25.00%, Hypnosis study), which provides evidence of general efficacy in trauma-focused treatments. Although every effort was made within the financial limitations of the study to ensure adherent and competent MI sessions, it remains possible that less seasoned use of MI style is less effective. This hypothesis remains to be tested.

Bearing the methodological considerations of the present study, and the broader limitations to this nascent area of research, in mind, the current findings echo the question: What can be done about dropout? Perhaps it is the nature of this avoidance-based disorder or the context of survivors' truly stressful lives that will continue to guide dropout no matter how finely tuned or masterfully administered the treatment. The

consistent finding of dropout across time, samples, therapists, and interventions for PTSD that would seem to indicate that dropout is a stable part of the recovery process for many individuals with PTSD, even those seeking treatment. Future research is needed to investigate continued means to enhance the effectiveness of available treatments for PTSD. Movements towards and away from change (e.g., initiating treatment and dropping out) are consistent with ambivalence, and may reflect this natural part of the change process for survivors, as the MI literature would predict (Miller & Rollnick, 2012). It is also possible that this process unfolds differently for individuals with differing psychological concerns, and inherently, cognitive and emotional response patterns. For example, individuals with PTSD, typified by fear-based reactions, may respond differential on average to MI or other preparatory interventions than individuals with GAD, typified by worry. This sample was not sufficiently powered to investigate these and other potential correlates to differential responses to treatment within the MI pilot sample. Future research is needed to investigate these areas for potential growth.

Clinically speaking, the current results indicate caution in defaulting to preparatory treatments prior to CBTs for PTSD. MI was well tolerated by those who completed treatment, but, in the current study, was associated with a high dropout rate during CPT and was not well rated by the two dropout participants who completed feedback at follow-up. Moreover, based on the broader literature, use of MI style would clearly be indicated when facing resistance in any therapeutic process. However, most individuals who present for trauma-focused treatment may not need to "get ready", and caution may be warranted in forestalling trauma focused treatments unless ambivalence or other contraindications are clearly present.

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Table 1

Pre-treatment Comparisons of the MI and Hypnosis ITT Samples on Demographics,

Trauma History, and Initial Symptom Presentation.

	MI+CPT (N = 17)	SM+CPT (n = 48)	Hyp+CPT (n = 44)	F or $\chi^{2\,a}$	p value	η^2_p or Cramer's V [b]	Power
Age (*M, SD*)	34.47 (11.84)	35.81 (10.56)	38.02 (13.05)	.70	.500	.01	.63
Years of education (*M, SD*)	15.00 (2.57)	14.77 (2.46)	13.50 (3.19)	3.02	.053[t]	.05	.63
Race				4.75	.093[t]	.21	.81
Black	11.76%	45.83%	54.55%				
White	70.59%	54.17%	43.18%				
Hispanic ethnicity	11.76%	4.17%	2.27%	2.56	.278	.15	.81
Marital status				8.50	.075[t]	.20	.71
Single	35.29%	64.58%	43.18%				
Married/living with someone	35.29%	12.50%	18.18%				
Separated/Divorced /Widowed	29.41%	22.92%	38.34%				
Time since trauma (*M, SD* months)	237.98 (174.90)	187.92 (173.24)	198.66 (184.37)	.50	.609	.01	.63
Trauma history							
Experienced CSA	70.59%	73.91%	70.45%	1.05	.592	.10	.81
Experienced CPA	58.82%	58.70%	59.09%	.001	.999	.004	.81
Experienced ASA	70.59%	69.57%	59.09%	1.33	.514	.11	.81
Experienced APA	47.06%	69.57%	68.18%	3.03	.220	.17	.81
Index event				3.45	.750	.13	.64
CSA	52.94%	41.03%	39.53%				
CPA	11.76%	6.52%	9.30%				
ASA	29.41%	28.26%	25.58%				

APA	5.88%	23.91%	25.58%				
CAPS total score (*M, SD*)	75.47 (17.49)	75.67 (16.18)	79.66 (14.92)	.85	.430	.02	.63
PDS total score (*M, SD*)	30.47 (7.07)	33.42 (8.45)	33.11 (9.34)	.77	.466	.01	.63
BDI-II total score (*M, SD*)	29.76 (12.01)	31.17 (9.84)	33.50 (11.07)	.94	.393	.02	.63
CAPS sleep item (*M, SD*)	5.24 (2.84)	6.79 (1.11)	7.18 (1.45)	8.99	.0001*	.15	.63
Stage of Change				4.45	.349	.14	.71
Pre-contemplation	6.25%	3.84%	4.35%				
Contemplation	37.50%	38.46%	56.52%				
Preparation/Action	60.00%	57.69%	39.13%				

Note. APA = adult physical assault, ASA = adult sexual assault, BDI-II = Beck Depression Inventory II, CAPS = Clinician Administered PTSD Scale, CSA = child sexual abuse, CPA = child physical abuse, PDS = Posttraumatic Diagnostic Scale.
[a-b] Chi-square and Cramer's V statistics are represented for categorical variables; ANOVA F and partial eta squared statistics are represented for continuous variables.
* = $p < .05$, [t] = $p < .10$.

Table 2

Comparison of MI and Hypnosis Study Conditions at Pre- and Mid-Treatment on RTC Measures.

	MI+CPT (N = 16)		SM+CPT (n = 23)		Hyp+CPT (n = 20)		Time (Main Effect)			Time x TxCond (Interaction Effect)		
	Pre-treatment M (SD)	Mid-treatment M (SD)	Pre-treatment M (SD)	Mid-treatment M (SD)	Pre-treatment M (SD)	Mid-treatment M (SD)	F (Time)	p	η^2_p	F (Time x TxCond)	p	η^2_p
URICA Omnibus test							4.36	.008*	.20	1.74	.120	.09
Pre-contemplation Score	1.41 (.38)	1.39 (.40)	1.66 (.55)	1.52 (.39)	1.72 (.74)	1.66 (.57)	4.33	.042*	.08	.61	.548	.02
Contemplation Score	4.72 (.26)	4.57 (.36)	4.62 (.51)	4.62 (.50)	4.48 (.87)	4.47 (.52)	11.65	.001*	.18	1.32	.276	.05
Preparation/ Action Score	4.05 (.57)	4.15 (.73)	4.23 (.59)	4.24 (.62)	4.05 (.85)	4.40 (.43)	11.32	.001*	.18	1.19	.314	.04
MPSOCQ Omnibus test							.74	.536	.04	.52	.793	.03
Pre-contemplation Score	2.17 (.65)	2.04 (.54)	2.72 (.73)	2.28 (.74)	2.51 (.74)	2.25 (.90)	.40	.531	.01	.01	.989	.00
Contemplation Score	4.23 (.34)	4.41 (.39)	4.21 (.48)	4.22 (.77)	4.36 (.38)	4.27 (.56)	.11	.744	.00	1.19	.314	.04
Preparation/ Action Score	3.26 (.79)	3.43 (.85)	3.41 (.80)	3.76 (.64)	3.68 (.90)	4.27 (.44)	1.46	.233	.03	.29	.748	.01

Note. Raw descriptive data are presented. Covariates are not included in the table for clarity, but years of education, initial sleep disturbance severity, and race were included in the corresponding model. MPSOCQ = Modified Pain Stages of Change Questionnaire, URICA = University of Rhode Island Change Assessment. Achieved power ranged from: URICA, .95 to .99 (main effect) and .37 (interaction effect); MPSOCQ, .78 to .93 (main effect) and .37 (interaction effect).
* = $p < .05$.

Table 3

Dropout, Non-response, and Primary Symptoms Outcomes for MI study and Comparison

Samples in the PTSD Treatment Outcomes Literature.

Study	Sample	Treatment	ITT N	Dropout rate	Non-responder rate	CAPS Follow-up M (SD)	PDS Follow-up M (SD)
MI Study	Female, Interpersonal assault survivors	MI+CPT	17	47.06%	33.33%	34.56 (21.05)[a]	13.89 (11.20)
Galovski et al, In preparation (Hypnosis Study)	Female, Interpersonal assault survivors	SM+CPT	48	47.92%	8.00%	24.20 (21.20)	11.36 (10.02)
		Hyp+CPT	44	40.91%	19.23%	26.88 (27.35)	12.69 (12.37)
		MI therapist (SM+CPT or Hyp+CPT)	8	25.00%	0.00%	17.50 (17.55)	6.50 (7.04)
Galovski et al. (2012)	Male and female, Interpersonal assault survivors	Variable length CPT	69	27.53%	4.00%	18.68 (21.56)	9.92 (12.36)
	Female, Interpersonal assault survivors	MI therapist (CPT or SMDT)	13	15.38%	0.00%	19.30 (14.82)	10.33 (8.73)
Resick et al. (2002)	Female, Rape survivors	CPT	62	26.79%	16.20%	26.78 (20.03)	9.75 (9.04)[d]
		PE	62	27.30%	29.70%	34.27 (26.89)	12.72 (10.98)[d]
Resick et al. (2008)[b,c]	Female, Interpersonal assault survivors	CPT	53	34%	25.9%	31.96 (28.46)	12.11 (11.94)
		CPT-C	51	22%	20.7%	31.03 (27.57)	12.22 (11.42)
		WA	55	26%	26.7%	35.90 (27.09)	14.62 (12.57)

Note. CAPS = Clinician Administered PTSD Scale, CPT = Cognitive Processing Therapy, CPT-C = Cognitive Processing Therapy - Cognitive restructuring only, CR = Cognitive Restructuring, Hyp = Sleep-directed Hypnosis Training, IE = Imaginal Exposure, IR = Imagery Rescripting, MI = Motivational Interviewing, PDS = Posttraumatic Diagnostic Scale, PE = Prolonged Exposure, SM = Symptom Monitoring, SMDT = Symptom Monitoring Delayed Treatment, WA = Written Account.
[a] LOCF was used for 1 of 9 completers on the CAPS.

[b] Follow-up statistics are reported for completer samples except in Resick et al. (2008), which reported only ITT statistics.

[c] Studies typically employed a 3-month follow-up statistics, except where noted, which report a 6-month follow-up.

[d] The PTSD Symptom Scale (PSS) was reported in place of the PDS.

Table 4

Progression through Treatment by Condition.

	MI+CPT ITT $N = 17$	SM+CPT ITT $n = 48$	Hyp+CPT ITT $n = 44$	F or $\chi^{2\,b}$	p value	η^2_p or Cramer's V ^{c}	Power
Dropped out	8	23	18	.49	.782	.07	.81
Dropped out before CPT	1	8	14				
Dropped out during CPT	7	15	4				
M CPT sessions before dropout	3.13 (3.04)	2.17 (2.27)	.39 (.78)	6.39	.004*	.22	.63
M missed sessions (completers only)	4.89 (3.89)	4.24 (4.20)	3.65 (3.65)	1.90	.160	.07	.63
M homework minutes per session ^{a}	119.04 (98.52)	132.51 (73.06)	192.71 (216.48)	1.58	.213	.05	.63

^{a} Average minutes of homework per session were computed for participants who completed at least 3 sessions.
$^{b-c}$ Chi-square and Cramer's V statistics are represented for categorical variables; ANOVA F and partial eta squared statistics are represented for continuous variables.
* = $p < .05$.

Table 5

Views of Treatment at CPT Session 1.

	MI+CPT (N = 16)	SM+CPT (n = 39)	Hyp+CPT (n = 30)	F	p value	η^2_p	Power
CPT logical	7.88 (1.20)	8.38 (.71)	8.10 (1.19)	1.66	.196	.04	.51
Confidence CPT change trauma symptoms	6.56 (1.32)	7.31 (1.66)	7.37 (1.30)	1.78	.175	.04	.51
Confidence CPT change other problems	7.06 (1.44)	7.31 (1.61)	7.10 (1.42)	.23	.797	.01	.51
Likely to recommend CPT to friend	8.38 (1.03)	7.74 (1.50)	7.87 (1.31)	1.25	.292	.03	.51

Note. Raw descriptive data are presented for all participants who attended session 1 of CPT. Data were not available for those who dropped out of treatment prior to CPT session 1. CPT = Cognitive Processing Therapy.
[t] $p < .01$.

Table 6

Comparison of MI and Hypnosis Study Completers at Pre-treatment and Follow-up on Primary Symptom Measures.

	MI+CPT (N = 9)		SM+CPT (n = 25)		Hyp+CPT (n = 26)		Time (Main Effect)			Time x TxCond (Interaction Effect)		
	Pre-treatment M (SD)	Follow-up M (SD)	Pre-treatment M (SD)	Follow-up M (SD)	Pre-treatment M (SD)	Follow-up M (SD)	F (Time)	p value	η^2_p	F (Time x TxCond)	p value	η^2_p
Omnibus test							43.82	.0001	.71	.438	.852	.02
CAPS Total Score	69.11 (18.02)	34.56 (21.05)	72.16 (15.71)	24.20 (21.20)	77.96 (12.96)	26.88 (27.35)	133.82	.0001	.70	1.31	.278	.04
PDS Total Score	29.33 (8.94)	13.89 (11.20)	32.12 (9.02)	11.36 (10.02)	33.69 (8.28)	12.69 (12.37)	89.86	.0001	.61	.59	.557	.02
BDI-II Total Score	26.89 (12.96)	13.11 (12.21)	31.84 (10.85)	13.08 (12.79)	30.88 (10.69)	11.46 (12.63)	64.84	.0001	.53	.51	.606	.02

Note. BDI-II = Beck Depression Inventory II, CAPS = Clinician Administered PTSD Scale, PDS = Posttraumatic Diagnostic Scale.
Achieved power ranged from: .79 to .86 (main effects) and .95 to .98 (interaction effects).
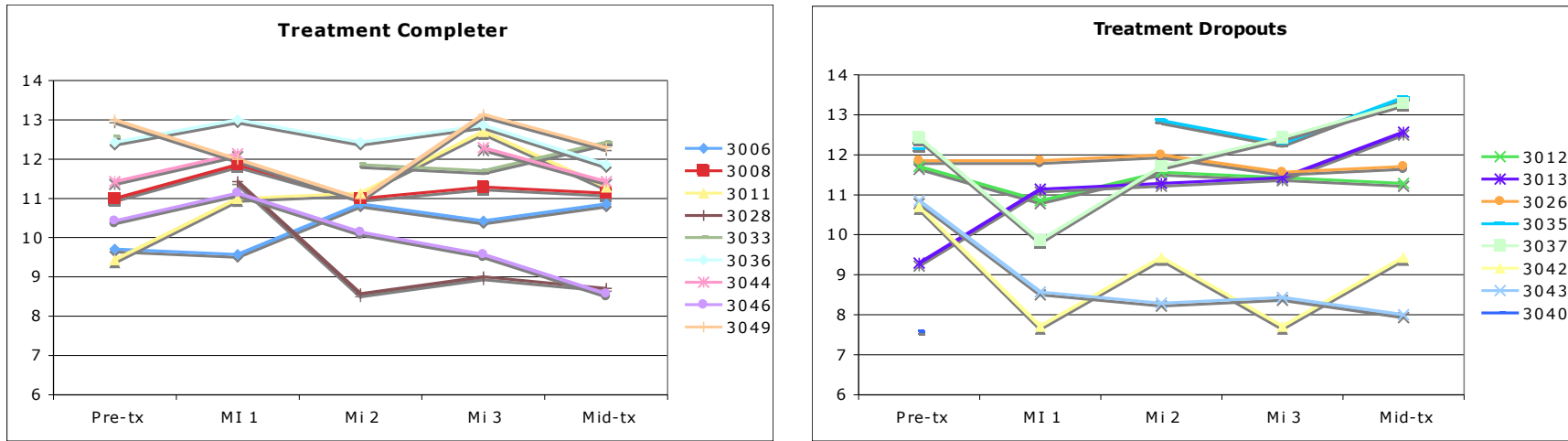
Treatment Completer

Legend (Treatment Completer):
- 3006
- 3008
- 3011
- 3028
- 3033
- 3036
- 3044
- 3046
- 3049

Treatment Dropouts

Legend (Treatment Dropouts):
- 3012
- 3013
- 3026
- 3035
- 3037
- 3042
- 3043
- 3040

Figure 1. Pre- to mid-treatment change on overall RTC (URICA scores) for each MI study participant by treatment completer status.
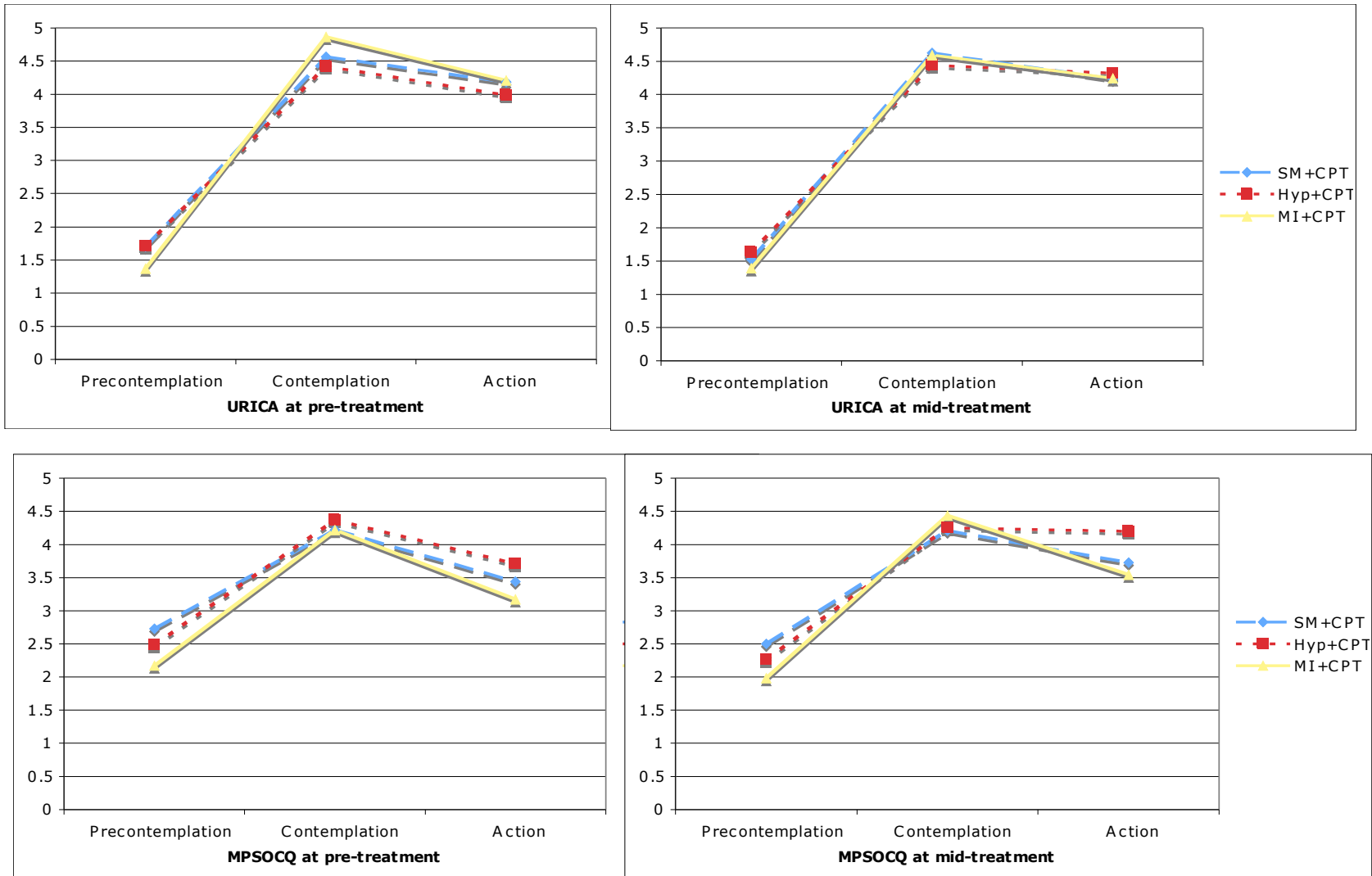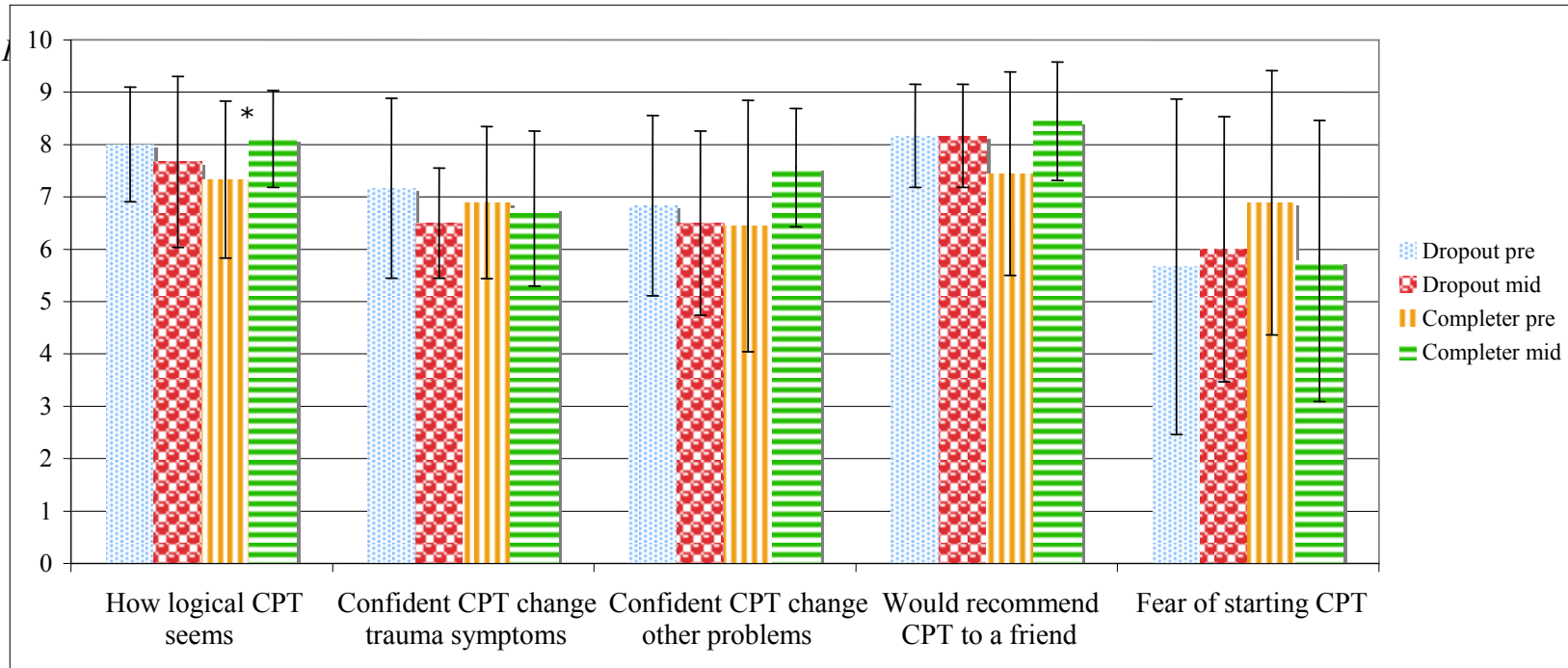
Figure 2. Pre- to mid-treatment change on RTC measures by treatment condition in the ITT sample, using estimated marginal means with years of education, initial sleep severity, and race covaried.
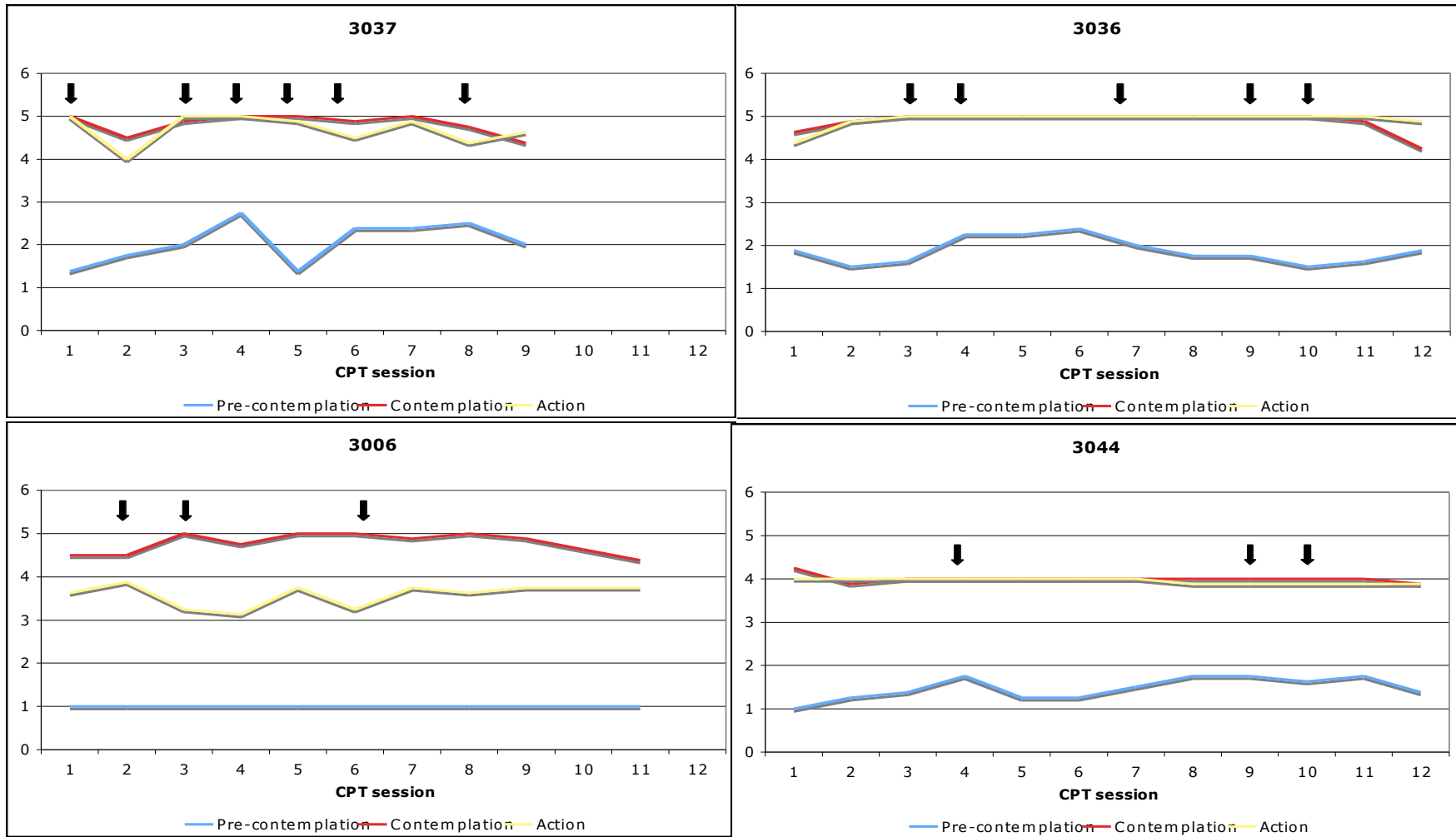
Figure 4. Session by session change in RTC subscale scores (URICA) over CPT for high MI users. Arrows indicate CPT sessions where MI was employed.
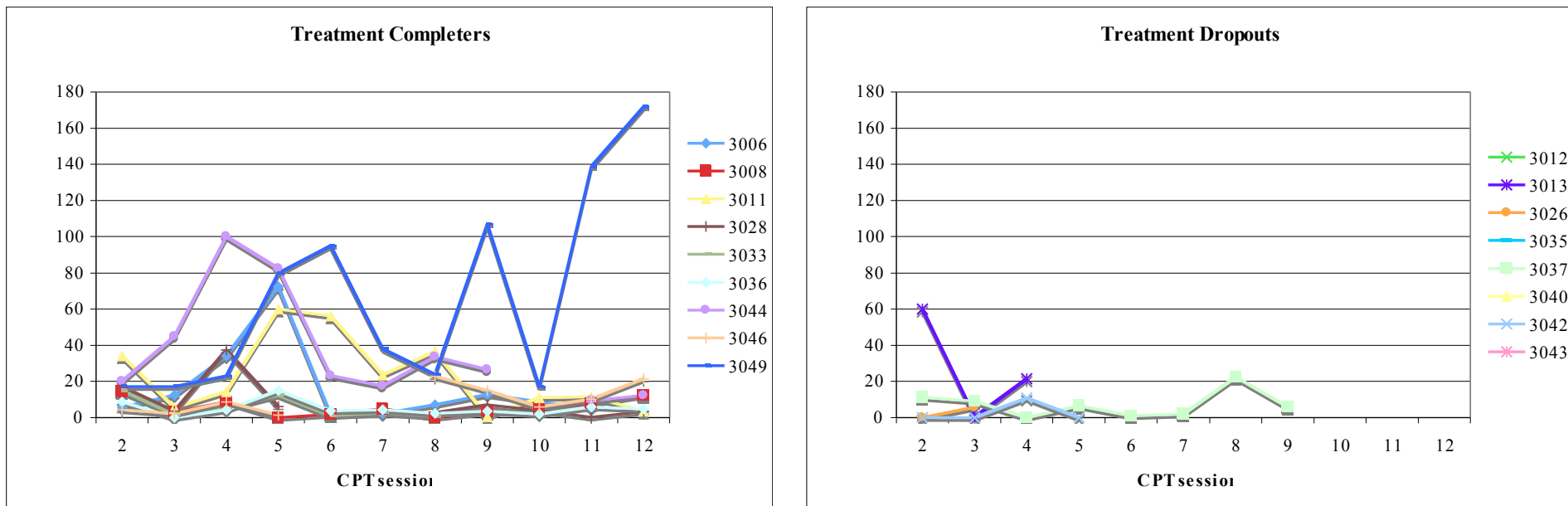
Figure 5. Reported minutes of homework per day by session for MI study participants by treatment completer status.