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AMBIVALENCE OVER EMOTIONAL EXPRESSION, SOCIAL CONSTRAINTS, AND TRAUMA AS MODERATORS OF EMOTIONAL AWARENESS AND EXPRESSION TRAINING AND RELAXATION TRAINING FOR INDIVIDUALS WITH IRRITABLE BOWEL SYNDROME

by

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THESIS

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

MASTER OF ARTS

2016

MAJOR: PSYCHOLOGY (clinical)

Approved By:

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Advisor Date

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ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. Mark Lumley, who has provided invaluable mentorship and support throughout this project. I am grateful to Dr. Elyse Thakur for her leadership on this project, as well as the many others in the Stress and Health lab (Jen Carty, Maisa Ziadni, Heather Doherty, Nancy Lockhart) whose hard work and dedication to the implementation of this study were indispensable to its success. Finally, I would like to thank my family and friends for their kindness, patience, and support, which have been instrumental in bringing this thesis to completion.

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CHAPTER 1

INTRODUCTION

Irritable bowel syndrome (IBS) is a functional bowel disorder characterized by abdominal pain or discomfort and features of disordered defecation (e.g., diarrhea, constipation; Rome III Diagnostic Criteria, 2012). This syndrome is estimated to occur in approximately 10-15% of the population (World Gastroenterology Organization, 2009) and affects women at a higher rate than men (Lovell & Ford, 2012). Irritable bowel syndrome is considered to have a multifactorial etiology, and should be viewed from a biopsychosocial perspective (Drossman, 1998; Halpert & Drossman, 2005).

Various psychosocial factors have been shown to play a role in the development of IBS and the severity of IBS symptoms (Drossman, 1999; Lea & Whorwell, 2003). Life stress is among the most studied of these factors. Both chronic life stress (Bennett, 1998) and daily stressful events and hassles (Dancey et al., 1998; Levy, Cain, Jarrett, & Heitempter, 1997) are positively related to IBS symptoms. This relationship appears to be reciprocal, so that stress impacts the severity of gastrointestinal (GI) symptoms, and GI symptoms contribute to stress (Blanchard et al., 2008). Stress may induce changes in GI function, autonomic and neuroendocrine responses, and pain modulation (Chang, 2011). Furthermore, there is evidence to suggest that stress contributes to central sensitization, which refers to the hypersensitivity of the central nervous system (Yunus, 2008), which is exhibited by many individuals with IBS and other functional somatic syndromes (Woolf, 2011; Zhou, Fillingim, Riley, Malarkey, & Verne, 2010). This relationship between stress and physiological mechanisms exemplifies the biopsychosocial understanding of IBS that prevails today.

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Other psychological, social, and personality variables are associated with IBS as well. Research suggests that psychopathology plays a role in the development of IBS (Sykes, Blanchard, Lackner, Keefer, & Krasner, 2003). In particular, depression and anxiety are strongly associated with coexisting somatic symptoms in general (Kroenke, 2003) and IBS specifically. Anxiety and depression have been shown to predict the subsequent onset of IBS (Koloski et al., 2012; Sykes, Blanchard, Lackner, Keefer, & Krasner, 2003). Furthermore, functional gastrointestinal disorders, which include IBS, are associated with the development of anxiety and depression at a later time, indicating a bidirectional relationship between the gut and the brain (Koloski et al., 2012). Similarly, worry is a factor in gastrointestinal symptom severity (Keefer et al., 2005) and pain (Lackner & Quigley, 2005) in individuals with IBS. Catastrophizing appears to work in conjunction with anxiety to maintain and/or exacerbate symptoms. Both catastrophizing and somatization are associated with IBS severity, and one study showed that catastrophizing and somatization were the mechanisms by which anxiety had an effect on IBS severity (van Tilburg, Palsson, & Whitehead, 2013). Furthermore, catastrophizing has been shown to be the mechanism by which worry is related to pain suffering (Lackner & Quigley, 2005).

The relationship between alexithymia, which refers to difficulty identifying or expressing feelings, and GI symptoms is fairly well-established among functional GI disorders. Those with functional gastrointestinal disorders are more alexithymic than those with inflammatory bowel disease, which is an organic (autoimmune) gastrointestinal disorder (Porcelli, Taylor, Bagby, & De Carne, 1999). In another study, alexithymia was shown to be a significant predictor of IBS and symptom severity. The defectiveness/shame schema, which is related to alexithymia in that it is thought to arise from fragility related to emotional deprivation, was also found to be a significant predictor of IBS and symptom severity in the same study (Phillips, Wright, & Kent, 2013). Finally,

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social support may act as a buffer against each of these risk factors; those with more social support tend to have lower IBS symptom severity and pain (Lackner et al., 2010).

Irritable bowel syndrome can be debilitating, greatly affecting the functioning and quality of life of many patients (Corney & Stanton, 1990; Frank et al., 2002), and feasible, effective treatments remain somewhat elusive. Because the mechanisms involved in the development of IBS are uncertain, pharmacological treatments target symptoms rather than causes. Pharmacological treatments include prokinetics for constipation, antispasmodics to reduce abdominal pain and cramping, and opioid agents, 5-HT_3 antagonists, and anticholinergic agents for diarrhea (Grundmann & Yoon, 2010). Ford et al. (2014) conducted a systematic review of studies comparing antidepressants, which are commonly prescribed for IBS, to placebo, and concluded that antidepressants are effective for IBS on average. However, many people do not benefit; the same review reported that of 592 patients assigned to antidepressant therapy, 260 (43.9%) reported unimproved IBS symptoms (Ford et al., 2014). Furthermore, most patients who reported improvement still had IBS symptoms.

Medical care costs for patients with IBS can be high (Levy et al., 2001; Longstreth et al., 2003), which is problematic especially if these medical treatments are not helpful for some patients. As many as 50% of individuals with IBS report having used complementary and alternative medicine approaches (Hussain & Quigley, 2006), including herbal therapies, mind-body therapies, acupuncture, dietary changes, probiotics, and exercise. Current systematic reviews provide conflicting findings, some reporting evidence-based support for these interventions, and others indicating no support (Yoon, Grundmann, Koepp, & Farrell, 2011). Psychological treatments for IBS, including cognitive behavioral therapy (CBT), relaxation training, hypnotherapy, multicomponent psychological therapy, dynamic psychotherapy, mindfulness

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meditation training, and stress management, have also been evaluated. Meta-analyses of psychological treatments for IBS have shown them to be effective overall (Lackner, Mesmer, Morley, Dowzer, & Hamilton, 2004; Ford et al., 2014). Relaxation training, which was used in the present study, is discussed in detail next.

Relaxation Training

Relaxation training is an arousal-reducing treatment which involves teaching individuals how to purposefully relax. Techniques such as progressive muscle relaxation, relaxed breathing, and guided imagery are often used, and are thought to decrease stress, pain, and anxiety if consistently practiced. Relaxation training is often a component of multicomponent treatments such as CBT, both in practice and in research. For example, one recent study (Labus et al., 2013) evaluated the efficacy of a brief psychoeducational intervention that consisted of education on a biological mind-body disease model and emphasized self-efficacy and practical relaxation techniques. The intervention was shown to be efficacious in reducing IBS symptom severity, depression, visceral sensitivity, and catastrophizing, and improving quality of life and coping skills. Although the direct effect of the relaxation component is unclear, this study illustrates how relaxation training is often a key component of other effective treatments

Blanchard, Green, Scharff, and Schwarz-McMorris (1993) compared relaxation training (composed primarily of progressive muscle relaxation) to regular GI-monitoring and found that participants assigned to relaxation training showed significantly more improvement on a composite measure of symptom reduction. Furthermore, 50% of the relaxation training group was clinically improved at the end of treatment. In a study that compared four, 90-minute sessions of relaxation training in small groups to a standard medical care control group, IBS symptom severity was significantly reduced in the relaxation training group compared to the control group. This

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effect was seen immediately after the intervention and 6 and 12 months later, suggesting that relaxation training has both short- and long-term benefits (Van der Veek, Van Rood, & Masclee, 2007).

There is some evidence for the effectiveness of other variations of relaxation training as well. Relaxation Response Meditation (RRM) consists of assuming a comfortable position in a quiet environment and focusing on the word "one" while maintaining a passive attitude. In a study that compared RRM to a waitlist control, 67% of the RRM group was clinically improved after treatment (Keefer & Blanchard, 2001). These effects remained at the 12-week and 1-year follow-up time points (Keefer & Blanchard, 2002). This study showed promising preliminary results, but a major limitation was the very small total sample size (N=13). Furthermore, while flatulence and belching, diarrhea, constipation, and bloating were improved, there was no change in pain or abdominal tenderness. Functional relaxation is an intervention used in the treatment of various psychosomatic disorders. It aims to positively stimulate the autonomic nervous system and facilitate proprioceptive awareness by performing diminutive movements of small joints during relaxed expiration, and focusing on the perceived differences of body feelings triggered by the movements. In one study, functional relaxation was compared to an enhanced medical care condition which consisted of treatment as usual plus two counseling interviews, and functional relaxation was found to be significantly superior to enhanced medical care in terms of reducing bodily and psychological impairment (Lahmann et al., 2010).

In conclusion, there is some support for relaxation training's usefulness in treating IBS symptoms, but relaxation training does not help everyone, and it is unclear who might benefit the most from relaxation training. Toner (2005) pointed out that many studies of CBT, which often include relaxation training, have methodological weaknesses such as insufficient sample sizes and

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control conditions. A final consideration related to relaxation training is that it is primarily aimed toward minimizing negative emotions and arousal. Although this may be helpful for some patients with IBS, there may be others who would benefit from becoming aware of, experiencing, and expressing their emotions, rather than directly attenuating them—a topic to which I now turn.

The Role of Emotional Awareness and Expression in IBS

There are established literatures showing that emotional expression and disclosure of the facts and one's thoughts and feelings about stressful experiences can be beneficial to health. These findings are consistent with research that shows that emotions are strongly connected with the body, and the experience and/or suppression of emotions induces physiological and subjective changes. In both individuals with IBS and healthy controls, everyday words with emotional content (e.g., angry, sad, anxious) induce changes in rectal tone, suggesting that emotional states modify intestinal reactivity (Blomhoff, Spetalen, Jacobsen, Vatn, & Malt, 2000). Furthermore, suppressing negative emotions has been shown to result in negative outcomes. For example, anger suppression has been implicated in the increase of pain in both healthy (Quartana, Bounds, Yoon, Goodin, & Burns, 2010) and chronic pain (Burns, Bruehl, & Quartana, 2006) samples.

This link between emotions and physical symptoms appears to be of particular importance in those with chronic pain conditions. It has been suggested that clinical interventions aimed at reversing anger suppression—that is, facilitating anger expression—may reduce chronic pain severity (Burns, Quartana, & Bruehl, 2008). Given the high levels of trait and suppressed anger found in patients with IBS compared to those with an autoimmune GI condition, Crohn's disease (Beesley, 2010), such interventions may be particularly helpful to those with IBS. In a similar vein, Abbass (2005) proposed that emotion-focused interviewing could be used in medical settings to help diagnose somatization, such that if experiencing anger or some other emotion in a clinical

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setting causes an immediate change in symptoms, then the patient likely is experiencing somatization.

The effectiveness of self-disclosure and emotional expression has been evaluated primarily by studying written emotional disclosure (expressive writing) in a wide variety of contexts and populations. Pennebaker and Beall (1986) first studied the effect of writing about traumatic experiences in a college student population and found that writing resulted in short-term increases in physiological arousal, but long-term decreases in health problems—especially for those who wrote not only about the trauma, but also about their feelings associated with it. Writing about stressful or traumatic events, compared to writing about neutral events has also been shown to improve symptom severity in people with asthma or rheumatoid arthritis (Smyth, Stone, Hurewitz, & Kaell, 1999) and reduce pain and fatigue and increase psychological well-being in patients with fibromyalgia (Broderick, Junghaenel, & Schwartz, 2005).

Written disclosure has been studied among those with functional gastrointestinal conditions as well. Written self-disclosure has been shown to be more effective than standard medical care in reducing activity-limiting GI pain and health care utilization among youth with functional abdominal pain, which is often a precursor of IBS (Wallander, Madan-Swain, Klapow, & Saeed, 2011). Among individuals with IBS, those who participated in online expressive writing showed a significant decrease in IBS severity and improved disease-related cognition compared to a non-writing group (Halpert, Rybin, & Doros, 2010). In this study, those who reported higher disclosure of emotions were more likely to show improvement in coping three months later.

Overall, experimental disclosure has been found to have a beneficial effect on participants' psychological health, physiological functioning, reported health, and general functioning (Frattaroli, 2006). However, the benefit of disclosure in specific pain populations is less clear, and

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appears to be rather modest (Lumley, Sklar, & Carty, 2012). Notably, the vast majority of research to date focuses on written emotional disclosure, as opposed to oral self-disclosure to others in one's life or with a clinician who can guide emotional expression. Less research has evaluated the effects of non-written emotional expression and self-disclosure, which may be more effective than written emotional expression and self-disclosure alone for individuals with chronic pain disorders such as IBS.

In a prior study, our laboratory developed and tested an intervention encouraging the awareness and expression of anger (Anger Awareness and Expression Training) for people with chronic headaches (Slavin-Spenny, Lumley, Thakur, Nevedal, & Hijazi, 2013). Furthermore, our research group is testing a similar emotional processing intervention which goes beyond anger to include other emotions, particularly connecting, vulnerable emotions, in patients with fibromyalgia. Following this line of research, Emotional Awareness and Expression Training (EAET) is a guided, non-written emotional processing intervention that encourages the awareness and expression of emotions, ranging from anger and dominance to vulnerability and connection. It will be important to evaluate whether such an intervention is are beneficial for patients with IBS and other chronic pain, and this study sought to contribute to that end.

Results from an RCT Comparing EAET and RT

Main effects from the RCT from which the current study is taken, which are in preparation for publication by Thakur et al. (2016), showed that both EAET and RT produced lower IBS symptom severity and anxiety and higher quality of life at 4-week follow-up compared to TAU, and these gains were maintained at 12-week follow-up, although TAU improved in symptom severity and anxiety as well, which eliminated any group differences on these two outcomes (Thakur, 2016). These findings are consistent with past research: emotional interventions,

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relaxation training, and other approaches appear to create positive change in IBS, but effect sizes tend to be modest, indicating that there are likely individual differences that moderate the effects (Lumley, 2004). Therefore, although it has been shown that both interventions are beneficial for individuals with IBS, more research is needed in order to determine who benefits most from each intervention.

Individual Differences in Response to IBS Treatment

Research has shown various factors that predict outcomes for a variety of treatments. For example, the presence of any Axis I disorder is associated with poorer outcomes from cognitive behavioral treatment of IBS (Blanchard, 1992). Among those with functional gastrointestinal disorders, having alexithymia or depression predicts poorer outcomes of combination treatments that consist of medications, diet modifications, and psychological counseling or brief psychotherapy; alexithymia emerged as the strongest predictor among the three (Porcelli et al., 2003). In a study of a psychoeducational group intervention for patients with IBS, those with low to moderate baseline quality of life showed greater improvement in symptom severity and quality of life compared to those with higher quality of life (Labus et al., 2013). Other variables, such as trauma history, emotional ambivalence, and social constraints may also play a role IBS onset and severity as well as treatment outcomes, and these literatures will be reviewed later.

Although some studies have evaluated predictors of IBS treatment, fewer have examined moderators of IBS treatments. Whereas predictors are baseline variables that relate to treatment outcomes regardless of which treatment, moderator variables predict treatment outcomes differently for different treatments, or for a treatment versus control condition. In a meta-analysis of experimental disclosure, Frattaroli (2006) identified several moderators of outcome. Physical health problems, a history of trauma or stressors, disclosing at home rather than in a controlled

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setting, greater privacy, greater number of disclosure sessions, length of disclosure sessions, detailed and specific disclosure instructions, and disclosure of events that had yet to be fully processed predicted greater overall effects of disclosure relative to control. Frattaroli emphasized that because the best way to test for moderators is to examine them in a single study, rather than across studies, as she did in her meta-analysis; thus it is best to consider the moderators she identified as a starting point for future testing.

Lumley (2004) developed a model of who benefits from emotional disclosure. According to this model, individuals are more likely to benefit from emotional disclosure when they have had stressful experiences, can consciously acknowledge negative affect, are able to identify and differentiate feelings, are motivated to disclose and value disclosure, are inhibited or ambivalent about disclosing, or exist in an environment that discourages disclosure. This model serves as a framework from which to consider potential moderators of the effects of interventions that encourage emotional expression. Three proposed moderators of the effects of emotional awareness and expression training are discussed in the following sections.

Trauma

The connection between traumatic experiences and IBS symptoms is well-established and widely recognized. In particular, patients with IBS have a greater prevalence of childhood and lifetime sexual abuse and trauma compared to patients with inflammatory bowel disease (Beesley, 2010; Jemelka & Russo, 1993; Ross, 2005) and pain-free control groups (Roelofs & Spinhoven, 2007). Physical and sexual trauma was also found to be independently associated with an elevated risk of IBS among women veterans (White et al., 2010). The association between IBS and trauma extends beyond sexual abuse to a wide range of early adverse life events, including general trauma and physical and emotional abuse (Ali et al., 2000; Bradford et al., 2012; Roelofs & Spinhoven,

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2007). Given the increased prevalence of trauma and abuse among patients with IBS, it is not surprising that post-traumatic stress disorder is common in patients with IBS and be positively associated with the severity of IBS symptoms (Irwin, Falsetti, Lydiard, & Ballenger, 1996).

Several mechanisms have been proposed in regards to the how traumatic events increase a person's likelihood of developing IBS. Traumatic events may predispose an individual to psychological distress, which would in turn predispose them to exaggerated reactions to stress which would manifest as symptoms of IBS and hypervigilance toward GI symptoms (Chitkara, van Tilburg, Blois-Martin, & Whitehead, 2008). It has also been suggested that other psychological factors, including neuroticism, may partly explain the relationship between abuse and IBS (Talley, Boyce, & Jones, 1998). Or, it may be the case that the relationship between trauma and IBS develops via psychophysiological mechanisms. O'Mahoney et al. (2009) found that early life stress induced changes across the brain-gut axis that could contribute to the susceptibility to develop stress-related disorders such as IBS in adulthood. Trauma may contribute to central sensitization (Drossman, 2010) or sensitization of intestinal visceral afferents (Chitkara et al., 2008). Abuse underlies hyperarousal and hypersensitivity, which underlie both post-traumatic stress disorder (PTSD) and IBS—which often co-occur (Drossman, 2010). Hyperresponsiveness of the HPA axis to visceral stressors is related to a history of early life adverse events; therefore, trauma may contribute indirectly to IBS by increasing HPA axis hyperresponsiveness (Videlock et al., 2009).

Taken together, there is more than sufficient evidence to suggest that many individuals with IBS have a trauma history. In considering what treatments will be most effective for individuals with IBS, it can be helpful to look to the psychotherapy treatment literature for post-traumatic stress disorder (PTSD), because both populations share trauma histories as a common

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factor. Because individuals with traumatic histories tend to avoid thoughts and feelings associated with their trauma, which they view as threatening, treatment should work toward reducing the avoidance of negative emotions associated with the traumatic events. Foa and Kozak's (1991) exposure therapy for PTSD aims to do this by exposing individuals to negative emotions and memories associated with the traumatic event in session. In-session exposure leads to emotional processing and fear reduction by activating the fear memory, leading temporarily to physiological arousal, and incorporating new cognitive and affective information about that fear memory (Foa & Kozak, 1986). It is reasonable to consider emotional exposure treatments to be potentially beneficial for individuals with IBS, given their higher rate of traumatic experiences.

Alternatively, emotion-reducing interventions such as relaxation training attempt to alleviate symptoms by directly decreasing physiological responses to stress and down-regulating or avoiding unpleasant or threatening emotions. It has been proposed that relaxation training may reduce hyperarousal symptoms in PTSD patients, thereby reducing distress about and avoidance of trauma-related stimuli, leading to therapeutic exposure even without formal exposure exercises (Taylor et al., 2003). Relaxation training has been shown to be moderately effective in reducing PTSD symptom severity, yet still less effective than exposure therapy (Marks, Lovell, Noshirvani, Livanou, & Thrasher, 1998; Taylor et al., 2003).

In sum, exposure therapy is currently the most effective treatment for PTSD. Therefore, individuals with IBS who have experienced traumatic events, which likely remain unprocessed and unresolved, may benefit from an intervention that encourages the full experience of unresolved emotions or conflicts related to the past trauma. Following this logic, such interventions will be of little benefit for those with IBS who have not experienced traumatic events. One such intervention

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is EAET, for which a central component of treatment is encouraging the disclosure of suppressed or hidden experiences and the identification, experiencing, and expression of associated emotions.

Ambivalence over Emotional Expression

Ambivalence over emotional expression refers to an individual's ambivalence, or conflicted feelings, about expressing his or her emotions. To date, no studies have examined ambivalence over emotional expression among patients with IBS, but some studies have examined related variables that have implications for this construct. Individuals with IBS tend to have higher anxiety in relationships and lower self-esteem than those with inflammatory bowel disease, which may lead to more conflicted feelings regarding expressing one's emotions, especially to a friend or family member (Bengtsoon, 2013). Bevan (2009) examined communication apprehension and topic avoidance among individuals with IBS, and found that higher levels of communication apprehension were found among individuals with IBS than those without it. Communication apprehension was significantly correlated with IBS abdominal pain severity and frequency, number of physician visits, and days spent in bed. Topic avoidance, which is defined as the deliberate decision not to share information about a specific topic with close relational partners, was reported more among those with IBS than those without it. Topic avoidance was positively correlated with abdominal difficulty and number of doctor visits, and was a significant predictor of abdominal difficulty. Furthermore, Ali et al. (2000) found that women with IBS scored higher than women with inflammatory bowel disease on measures of self-silencing, which refers to silencing certain thoughts, feelings, and actions in an attempt to create and maintain safe, intimate relationships. Together, these findings indicate that ambivalence over emotional expression may be prevalent among individuals with IBS and may exacerbate IBS symptoms.

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Because the self-silencing and topic avoidance that may result from ambivalence over emotional expression have been shown to be related to IBS symptom severity and frequency, reversing such patterns in individuals with IBS may help to reduce pain and discomfort. If in fact ambivalence over emotional expression increases IBS symptom severity and frequency, and reducing ambivalence may reverse or reduce these symptoms, we may expect that those with *more* ambivalence would benefit more than those with less ambivalence, from treatments that encourage emotional expression, compared to treatments that do not. In one study, ambivalence over emotional expression was tested as a treatment moderator among women with chronic pelvic pain who participated in an emotional disclosure intervention. Women with ambivalence over emotional expression showed health improvements after the disclosure, whereas those with ambivalence in the control condition showed a worsening of symptoms. This effect was independent of the effect of negative affect on outcomes (Norman, Lumley, Dooley, & Diamond, 2004). This is good preliminary evidence that individuals with IBS who have ambivalence over emotional expression will benefit from EAET.

Social Constraints

Social constraints are experienced "whenever we are compelled by others to regulate, restrict, or modify our thoughts, actions, or feelings" (Lepore & Revenson, 2007, p. 313). No research has yet explored the relationship between IBS and the construct of social constraints. Perhaps the nearest construct is perceived social support, because those who do not feel supported by their loved ones likely feel more constrained in the expression of their thoughts and feelings.

Social constraints can be conceived as a potential moderator of EAET outcomes in much the same way as ambivalence over emotional expression. Those who are high in ambivalence over emotional expression are likely not to express their feelings because they feel unsure and

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conflicted; those who are high in social constraints are likely not to express their feelings because they feel pressured by others not to, in order to keep the peace. In both instances, an intervention aimed toward facilitating emotional awareness and expression will likely be helpful.

Goal of This Study

The goal of this study was to examine which patients with IBS improve the most from engaging in Emotional Awareness and Expression Training, relative to a conceptually opposite intervention—relaxation training—and to no intervention. Childhood trauma, ambivalence over emotional expression, and social constraints were examined as potential moderators of health outcomes of EAET relative to the other two. Data for these analyses were taken from a randomized controlled trial that examined the effects of EAET on overall improvement in symptoms, psychological functioning, IBS symptom severity, and quality of life in patients with IBS.

Hypotheses

This study examined four hypotheses regarding the impact of three primary potential moderators and three secondary potential moderators on health outcomes of EAET.

1. It was hypothesized that childhood traumatic events would moderate the effects of EAET on health outcomes, such that those with more childhood traumatic events would have greater improvements in health outcomes following EAET compared to both RT and waitlist control.

2. It was hypothesized that ambivalence over emotional expression would moderate the effects of EAET on health outcomes, such that those high in ambivalence over emotional expression would have greater improvement in health outcomes following EAET compared to RT and waitlist control.

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3. It was hypothesized that social constraints would moderate the effects of EAET on health outcomes, such that those high in social constraints would have greater improvements in health outcomes following EAET compared to RT and waitlist control.

4. It was hypothesized that three additional emotion-related variables – impact of events (PTSD symptomatology), emotional approach coping, and alexithymia – would moderate health outcomes following EAET compared to RT and waitlist control. Because these analyses were exploratory, no specific hypotheses regarding directionality were made.

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CHAPTER 2

METHODS

Participants

Participants were 106 men and women over the age of 18 who had a physician-provided diagnosis of irritable bowel syndrome (IBS) and/or who fulfilled all Rome-III criteria for IBS as determined by our interview. Prospective participants were recruited from the larger community as well as the university community to ensure a representative sample. Recruitment methods included advertisements on the university pipeline, newspaper advertisements, fliers on campus and in the community, and brochures and fliers at doctor's offices, particularly those of collaborating gastroenterologists. SONA, an online tool used by the Psychology Department to screen students to participate in psychological research, was also used to identify students who had IBS. We invited those students to participate in the study by contacting them via phone and/or email.

Individuals who expressed interest by contacting the lab via email or phone were asked to participate in a phone screening to verify their interest and eligibility to participate. First, respondents were told about the study over the phone. If they remained interested, they were then asked more detailed screening questions to determine whether or not they were eligible to participate. To be eligible to participate, individuals must have reported that they had a diagnosis of IBS and met the Rome III Diagnostic Criteria for Functional Gastrointestinal Disorders, specifically for IBS (Rome III Diagnostic Criteria, 2012). That is, they must have reported that they had recurrent abdominal pain or discomfort, or a change in stool frequency or form, at least three days per month for the last three months. They must also have reported having pain and discomfort at least two days per week at the time of screening. Individuals who reported having

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post-infectious IBS, organic gastrointestinal diseases (e.g., inflammatory bowel disease including Crohn's disease and ulcerative colitis), immunodeficiency, a current psychotic disorder or bipolar disorder, drug or alcohol dependence within the past two years, inability to communicate in English, and/or participation in another clinical research trial for IBS were excluded.

Procedures

Individuals who met study criteria and were interested in participating were invited to the laboratory to review the study procedures and provide written, informed consent. One of the study therapists was assigned, based on her availability, to do this in-person work with each participant. The participants also signed a release of their medical records so we could send a diagnostic confirmation form to their primary care physician or gastroenterologist, which we asked to be faxed back. We proceeded, however, based on patient's self-reported diagnosis and used the physician confirmation if available.

Participants then filled out several baseline questionnaires, assessing their IBS health and functioning, psychological distress, and quality of life. They also completed the various potential moderator measures at the same time. Participants entered the data using a web-based computer system (Qualtrics). After the baseline questionnaires were complete, the therapist consulted a randomization scheme to determine to which of the three intervention conditions the participant was assigned. Randomization was then conducted in advance using the website, randomization.com. Randomization was stratified by therapist and participant gender and conducted in randomized blocks of three and six, so that the three conditions had equal proportions of men and women and equal sample sizes after each block, and therapists worked with equal numbers of men and women in each treatment condition. All randomization envelopes were created in advance and sealed prior to baseline.

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Participants assigned to either of the two active interventions (EAET or RT) began their first session immediately following their baseline assessment. Sessions were conducted at the Wayne State Stress and Health lab and at various external locations that are part of Wayne State (i.e., Oakland Center and Macomb Center). After the first visit, participants were scheduled to return in one week for the second session and the week after that for their third session. Following the third session, participants were asked to return to the laboratory two weeks later to fill out follow-up questionnaires under supervision. Participants were then scheduled to return in 8 weeks for their second follow-up visit. For both follow-ups, participants were given the option of completing the measures from home using their own computer, if they preferred. Participants who were in the waitlist control group completed follow-up questionnaires 4 and 12 weeks after baseline (the equivalent time points to the two follow-up assessments for the active treatment conditions), and were given the opportunity to participate in the intervention of their choice (either RT or EAET) after the 12-week assessment. Participants were paid $20 for completing each of the three assessment sessions (or up to $60 total). Intervention sessions were provided for free, and participants were not compensated for the intervention sessions.

All three sessions for both interventions were conducted in an individualized format and ran for 50 minutes, once per week. All intervention sessions were run by one of five female therapists who were either graduate students in clinical psychology or a master's level nurse. All therapists were trained and supervised by a licensed clinical psychologist, and sessions were audio recorded to facilitate supervision and fidelity checks. Sessions were conducted in a private room. At the beginning and end of each session, patients completed a brief measure of their mood and symptoms. At the end of each session, homework was provided so that participants could practice

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the skills learned in session. Regardless of condition, all participants were instructed to maintain their usual care (i.e., pharmacological, dietary, or behavioral interventions) throughout the study.

Emotional Awareness and Expression Training

Emotional awareness and expression training (EAET) is an emotional processing intervention. It is based on the principle that emotional suppression can lead to chronic overarousal, symptoms including pain, and a dysregulated brain-gut neuroenteric system. The goal of the intervention is to help patients reduce stress by: a) having them learn about connections between their stressful life experiences and physical symptoms; b) teaching them to identify, experience, and express their emotions related to these stressful situations; and c) encouraging them to engage in healthy emotional and interpersonal behaviors in their daily lives, including assertive and genuine communication. Ultimately, this intervention is intended to reduce IBS symptoms by promoting cognitive and affective changes that improve an individual's ability to experience, express, and resolve their emotions and relate to others. Over the course of the three sessions, patients first had a life history interview, which helped them connect their IBS to their life experiences. Subsequently, the therapist conducted experiential exercises to help patients engage with their avoided feelings, behaviors, memories, and relationships. Finally, patients were encouraged to communicate more genuinely in their relationships. The three EAET sessions are as follows:

Session One. A rationale for treatment was given, and the relationship between stress and IBS was explored. The therapist focused on the role that emotional avoidance plays in the relationship between stress and health. Next, participants were given a life history interview to learn about their life experiences, particularly those that have been stressful and that continued to be unresolved. To help participants recognize how life stress and emotional processes had

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contributed to their IBS, the therapist created a detailed timeline of the participant's experiences during the interview. The therapist also pointed out indicators of emotional avoidance and explained how this perpetuates both stress and symptoms. At the end of the session, the therapist and participant discussed the participant's timeline and reaction to the interview. A writing exercise that asked participants to express thoughts and feelings about conflicted relationships in the form of unsent letters was given as homework.

Session Two. The therapist and participant reviewed the homework assignment and discussed what stressors the participant identified and wrote about. Barriers to homework were explored. After that, the therapist discussed the importance of expressing emotions. The participant learned that emotional suppression can cause stress, which can exacerbate pain and alter bowel functioning. They also learned that expression of certain emotions (e.g., anger, sadness, intimacy) is often avoided because of fear or potential rejection by others. The bulk of the session involved experiential exercises in which the therapist encouraged the participant to experience and express emotions relevant to their stressful relationships, particularly those written about during the week. These exercises also encouraged patients to experience affect in their bodies, and then communicate these emotions directly, out loud, with voice, face, tone, and physical expression. The therapist took a balanced stance that is both supportive but also directive to facilitate this process. After this exercise, the therapist encouraged the participant to reflect on their experience. Participants were assigned a homework assignment that asked them to monitor their emotional avoidance and suppression in relationships, and asked them what they would ideally communicate.

Session Three. The final session began by discussing the participant's homework. Barriers to homework were explored. The therapist then reviewed what the participant learned in the previous session, and the participant engaged in more emotional expression during interactive,

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experiential exercises. The bulk of the session was devoted to helping the patient learn how to honestly and directly communicate feelings to others in an adaptive, responsible manner. For example, assertive communication and the expression of care or love was examined and taught. The participant practiced such honest communication during role-plays in session. At the end of the session, there was a discussion of what the participant learned throughout the intervention. The participant also generated goals for the future and discussed how they could continue to implement emotional expression and assertive communication skills into their everyday lives.

Relaxation Training

Relaxation training (RT) is a stress-management treatment for IBS. It is an arousal reduction approach, which is conceptually the opposite of EAET. It is based on the premise that long-term stress elevates physiological arousal, exacerbates pain, and dysregulates communication between the brain and the gut. The goal of RT is to reduce physiological arousal, thereby attenuating symptoms. To facilitate this process, participants were taught different relaxation training skills (e.g., progressive muscle relaxation, applied relaxation, and guided imagery). During each session, participants were guided through the relaxation exercise. They also learned variations of the techniques (e.g., relaxation mini-practices), so they could integrate them into their everyday lives. In the end, these exercises minimized IBS symptoms by instigating cognitive and behavioral changes that influence how one responds to stressors. The three RT sessions were as follows:

Session One. A rationale for treatment was emphasized that stress causes arousal, which increases symptoms, and that the goal of this technique is to directly reduce arousal. In addition, the relationship between stress and IBS was discussed. After discussing these ideas, the therapist guided the participant through a 20-minute relaxation exercise, Progressive Muscle Relaxation

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(PMR; Jacobson, 1938). The therapist demonstrated how to do the exercise, and then the participant practiced. Following the exercise, the participant and the therapist discussed the participant's reaction to PMR. Then, for a homework assignment, the therapist asked participants to listen to an audio recording (on CD or mp3) once per day that guided them through a PMR practice.

Session Two. At the beginning of the session, the homework assignment was discussed. The participant and therapist discussed how often the participant listened to the audio recording, and evaluated how helpful it was at helping them relax. Barriers to practice were also explored. After that, the therapist introduced the participant to the concept of applied relaxation, and guided him or her through a 30-60 second relaxed breathing exercise (a "mini-practice"). Next, the therapist taught the participant a 20-minute relaxed breathing technique. Following this exercise, the therapist and participant discussed the participant's reactions to this technique, and explored how much the participant liked this exercise compared to PMR. For homework, the participant was asked to practice this technique or PMR daily.

Session Three. This session followed a similar format to Session two. First, homework was discussed and barriers to practice were explored. After that, the therapist taught the participant a 20-minute guided imagery relaxation exercise. Following the exercise, the therapist and participant discussed the participant's reactions to this exercise, and explored how much the participant liked this exercise compared to the other relaxation training techniques. At the end of the session, the participant described their experience with relaxation training in general and reflected on their ability to manage stress. The final portion of the session was devoted to goal setting, where the participant described how they will incorporate relaxation training into their daily routine in the

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future. The therapist encouraged the participant to continue to use the audio recordings to help them reach their goals.

Waitlist Control

After baseline and during the intervention phase of this study, participants in the waitlist control condition engaged in only standard medical care. After completing the 4- and 12-week follow-up assessments, participants in the waitlist control condition were given the opportunity to participate in RT or EAET. Both interventions were described in detail, and then participants indicated which one they preferred. Sessions were scheduled with a therapist and began immediately or shortly after their final assessment.

Primary Potential Moderator Measures

Early Trauma Inventory Self-Report Short Form (ETISR-SF; Bremner, Bolus, & Mayer, 2007). On this 27-item questionnaire, participants are asked to answer "yes" or "no" to a series of questions related to trauma experiences before the age of 18. The questions are grouped into four parts: General Traumas (e.g., "Were you ever exposed to a life-threatening natural disaster?"), Physical Punishment (e.g., "Were you ever slapped or kicked?"), Emotional Abuse ("Were you often put down or ridiculed?"), and Sexual Events (e.g., "Did you ever experience someone rubbing their genitals against you?"). Items endorsed as "yes" were added together to yield a total score, and higher total scores indicate more traumatic experiences.

Ambivalence over Emotional Expressiveness Questionnaire (AEQ; King & Emmons, 1990). This 14-item scale is used to rate participants' ambivalence over expressing emotion. Participants are asked to read each statement related to their goals and conflicts in regard to emotional expression (e.g., "Often I'd like to show others how I feel, but something seems to hold me back") and indicate how frequently they have felt or experienced each one. Items are rated on

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a scale of 1 ("I have never felt like this") to 5 ("I feel like this a lot"). Items are then averaged, and higher mean scores indicate greater ambivalence over emotional expressiveness. This scale had high internal consistency (α = .88).

General Social Constraints Scale (Lepore & Ituarte, 1999). This 15-item scale asks participants to report how often friends or family members respond to them in such a way that suggested the participant should conceal, avoid, or minimize sharing problems or concerns. (e.g., "How often in the past month have your friends or family members changed the subject when you tried to discuss your problems?"). All items are rated on a scale of 1 ("never") to 4 ("often"). Items are then totaled, and higher mean scores indicate more social constraints. This scale had high internal consistency (α = .91).

Secondary Potential Moderator Measures

Three additional emotion-related variables were also explored as potential moderators. The Impact of Events Scale-Revised (IES-R; Weiss & Marmar, 1996) is a 22-item self-report scale used to measure post-traumatic stress symptomatology. All items are rated on a scale of 0 ("not at all") to 4 ("extremely"). Responses on three subscales (Intrusion, Avoidance, and Hyperarousal) were averaged to create mean subscale scores, and then the three subscales were summed to create a total score, with higher scores indicating greater PTSD symptomatology. This scale had high internal consistency (α = .91). Emotional approach coping (EAC) refers to the extent to which an individual uses emotional expression and processing to cope with stress (Stanton, Kirk, Cameron, & Danoff-Burg, 2000). All items are rated on a scale of 1 ("I don't do this at all") to 4 ("I do this a lot"). Responses were averaged to create a mean scale score, with higher scores indicating a stronger tendency toward using emotional expression and processing to cope with stress. This scale had high internal consistency (α = .88). The 20-item Toronto Alexithymia Scale (TAS-20; Bagby,

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Parker, & Taylor, 1994) is a self-report scale that measures alexithymia, which refers to difficulty identifying and describing feelings. All items are rated on a scale of 1 ("strongly disagree") to 5 ("strongly agree"). Participants' responses on all items were averaged to create a mean scale score, with higher scores indicating more alexithymia. This scale had high internal consistency (α = .77).

Health Outcome Measures

McGill Pain Questionnaire (Melzack, 1975). The McGill Pain Questionnaire is a 23-item self-report measure of pain. Participants were asked to report the quality and intensity of their pain by rating the intensity of different types of pain (i.e., "aching," "sharp," "suffocating") on a 1-10 scale. In this study, we averaged participants' ratings to create a Total Pain score. This scale had high internal consistency (α = .90).

IBS Symptom Severity Scale (IBS-SSS; Francis, Morris, & Whorwell, 1997). The IBS-SSS consists of five questions measured on a 0-100 numerical rating scale. These questions assess the severity and frequency of abdominal pain, the severity of abdominal distention, dissatisfaction with bowel habits, and interference with quality of life over the last 10 days. All five items were summed to create a total IBS symptom severity score (range: 0 – 500). A higher score indicates greater symptom severity. This scale has an internal consistency of α = .46.

Irritable Bowel Syndrome-Quality of Life (IBS – QOL; Patrick, Drossman, Frederick, Dicesare, & Puder, 1998). This 34-item scale assesses how IBS impacts participants' quality of life across several domains, including mood, activities, body image, health worry, social reaction, sexuality, and relationships. Participants are asked to report how they generally feel by indicating their level of agreement with each item on a scale of 1 ("not at all") to 5 ("a great deal"). A total score was obtained by summing all items, with higher scores indicating *poorer* quality of life. This scale has an internal consistency of α = .95.

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Brief Symptom Inventory (Derogatis & Melisaratos, 1983). This 53-item scale assesses a range of symptoms and general psychological distress. For each item participants rate their discomfort over the past 2 weeks on a 5-point scale that ranges from 0 ("not at all") to 4 ("extremely"). In this study, the Depression (α = .84), Anxiety (α = .78), and Interpersonal Sensitivity (α = .85) subscales were analyzed.

Clinical Global Impressions (CGI) Improvement Scale – IBS version (Klein, 1999). Participants were asked to compare their symptoms of abdominal discomfort or pain and bowel symptoms before entering the study to those during the past week, on a 1 ("substantially improved") to 7 ("substantially worse") scale. This measure was given only at the 4-week and 12-week follow-up time points, but not at baseline.

Statistical Analyses

After conducting standard data cleaning procedures, SPSS version 22 was used to compute descriptive statistics and bivariate correlations. Before testing the study's hypotheses, missing outcome data was replaced by carrying the last value forward (i.e., missing 4-week follow-up scores were replaced with the same participant's baseline scores, and missing 12-week follow-up scores were replaced with 4-week follow-up scores). Then, change scores from baseline to each follow-up timepoint were calculated; that is, baseline scores of each outcome measure were subtracted from scores at 4-week and 12-week follow-ups. Thus, changes in health outcome variables at 4-week follow-up and 12-week follow-up served as the dependent variables. The PROCESS macro (Hayes, 2013) was used to conduct moderation analysis (MODEL 1). To test for significance of effects, we obtained 95% bias-corrected bootstrapped confidence intervals based on 1,000 bootstrapped samples.

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CHAPTER 3

RESULTS

Analyses of baseline data indicated that the three conditions were comparable on age, gender, ethnicity, marital status, duration of symptoms (Table 1), and baseline levels of outcome data (Table 2). See Table 3 for means, standard deviations and ranges of the potential moderators, and the correlations among them. Table 4 provides means, standard deviations, and ranges for outcome variables. Overall, moderators were moderately to highly correlated in the expected directions. Trauma, ambivalence over emotional expression, general social constraints, impact of events, and alexithymia all were positively correlated with one another (r = .17 to .60), but emotional approach coping was negatively correlated with these moderators (r = -.13 to -.61). This is to be expected, given that emotional approach coping measures an adaptive form of coping, and the other moderators are measures of harmful events and negative emotional processes. Please see Tables 5-10 for all correlations between moderators and changes in outcome measures at follow-up for each of the three treatment conditions.

Trauma

To test the hypothesis that participants with more childhood traumatic events would have greater improvements in health outcomes following EAET compared to RT and waitlist control, moderation analyses were conducted. This hypothesis was not supported. Baseline trauma moderated the effect of treatment group (RT vs. WLC; RT vs. EAET) on changes in anxiety at the 12-week follow-up. This moderation effect was significant for RT vs. WLC (b = -.05, t(100) = -2.05, 95% CI [-.10, -001], p = .04) and marginal for RT vs. EAET (b = -.05, t(100) = -1.96, 95% CI [-.09, .001], p = .05). Specifically, trauma weakly predicted improvement in anxiety from baseline to 12-week follow-up after RT (r = -0.21) compared to less improvement in anxiety at

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12-week follow-up after WLC (r = .27) and EAET (r = .26; see Figure 1). See Table 5 for correlations and significance for each condition.

Ambivalence over Emotional Expression

To test the hypothesis that those high in ambivalence over emotional expression would have greater improvement in health outcomes following EAET compared to RT and WLC, moderational analyses were conducted. This hypothesis was not supported. Ambivalence over emotional expression moderated the effect of treatment group (RT vs. WLC) on depression at the 4-week follow-up (b = -.34, t(100) = -2.01, 95% CI [-.68, -.00], p = .047), such that ambivalence significantly predicted improvement in depression from baseline to 4-week follow-up after RT (r = -.35) compared to less improvement in depression after WLC (r = .08; see figure 2).

Ambivalence also significantly moderated the effects of treatment group (RT vs. WLC) on interpersonal sensitivity at the 4-week follow-up (b = -.50, t(5, 90) = -2.14, 95% CI [-.97, -.04], p = .04) and marginally so at the 12-week follow-up (b = -.45, t(5, 86) = -1.76, 95% CI [-.95, .06], p = .08). Specifically, ambivalence significantly predicted improvement in interpersonal sensitivity from baseline to 4-week follow-up (r = -.37) after RT, compared to a very small relationship between ambivalence and worsened interpersonal sensitivity (r = .07) after WLC (see Figure 3). At 12-week follow-up, ambivalence predicted improvement in interpersonal sensitivity 12-weeks after RT (r = -.35) compared to no relationship after WLC (r = .02; see Figure 6).

Additionally, ambivalence marginally moderated the effects of treatment group (RT vs. EAET, b = -.79, t(100) = -1.82, 95% CI [-1.66, .07], p = .07; RT vs. WLC, b = -.76, t(100) = -1.93, 95% CI [-1.55, .02], p = .06) and McGill total pain at the 12-week follow-up. Higher ambivalence at baseline significantly predicted improvement in total pain from baseline to 4-week follow-up

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after RT (r = -.37), compared to no relationship after WLC (r = .06) and EAET (r = .05; see Figure 5).

Finally, ambivalence over emotional expression marginally moderated the effects of treatment group (RT vs. EAET) on anxiety at the 12-week follow-up (b = -.30, t(100) = -1.75, 95% CI [-.64, .04], p = .08), such that baseline ambivalence predicted improvement in anxiety from baseline to 12-week follow-up after RT (r = -.20) compared to less improvement after EAET (r = .23; see Figure 6). See Table 4 for correlations and significance for each condition.

General Social Constraints

To test the hypothesis that those high in social constraints would have greater improvements in health outcomes following EAET compared to RT and waitlist control, moderation analyses were conducted. This hypothesis was partially supported. Social constraints moderated the effects of treatment group (RT vs. EAET, b = -.04, t(100) = .01, 95% CI [-.06, -.01], p < .01; RT vs. WLC, b = -.05, t(100) = -3.69, 95% CI [-.08, -.02], p < .001) on anxiety at 12-week follow-up. Specifically, higher social constraints significantly predicted improvement in anxiety from baseline to 12-week follow-up after RT (r = -.42), compared to less improvement following EAET (r = .20) and WLC (r = .41; see Figure 7).

Social constraints also moderated the effects of treatment group (RT vs. EAET, (b = -.07, t(100) = -1.66, 95% CI [-.15, .01], p = .0998); RT vs. WLC, b = -.14, t(100) = -3.07, 95% CI [-.24, -.05], p = .003); EAET vs. WLC, b = .08, t(100) = 1.79, 95% CI [-.01, .16], p = .08) on 4-week IBS symptom severity. This moderating effect was significant for RT vs. WLC, and marginally significant for RT vs. EAET and EAET vs. WLC. Specifically, higher baseline social constraints significantly predicted improvement in symptom severity from baseline to 4-week following RT (r = -.36) compared to less improvement after WLC (r = .36). Social constraints significantly

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predicted improvement in IBS symptom severity following RT (r = -.36) compared to no relationship after EAET (r = -.01). Higher baseline social constraints significantly predicted improvement in symptom severity after WLC (r = .36), compared to no relationship with improvements in symptom severity from baseline to 4-week follow-up after EAET (r = -.01; see Figure 8).

Similarly, social constraints moderated the effects of treatment group (RT vs. WLC, b = -.03, t(100) = -2.50, 95% CI [-.05, -.001], p = .01; EAET vs. WLC, b = 02, t(100) = 1.94, 95% CI [-.001, .04], p = .055) on IBS-related quality of life at 4-week follow-up. This moderating effect was significant for RT vs. WLC, and marginally significant for EAET vs. WLC. Specifically, baseline social constraints significantly predicted improved IBS-related quality of life after RT (r = -.37) compared to less improvement after WLC (r = .28). Social constraints also predicted improvement in IBS-related quality of life after EAET (r = -.22) compared to less improvement after WLC (r = .28; see Figure 9).

Finally, social constraints marginally moderated the effects of treatment group (RT vs. WLC) on interpersonal sensitivity at 12-week follow-up (b = -.05, t(100) = -1.89, 95% CI [-.10, .003], p = .06), such that baseline social constraints predicted improvement in interpersonal sensitivity from baseline to 12-week follow-up after RT (r = -.25) compared to less improvement after WLC (r = .18; see Figure 10). See Table 7 for correlations and significance for each condition.

Additional Analyses

Additional emotion-related variables were tested as moderators using exploratory moderation analyses.

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Impact of Events. Impact of events (i.e., PTSD symptomatology following trauma) emerged as a moderator of the effects of treatment group (RT vs. WLC, b = -.33, $t(100) = -1.99$, 95% CI [-.66, -.01], $p = .049$; EAET vs. WLC, b = .30, $t(100) = 1.87$, 95% CI [-.02, .62], $p = .07$) on total pain at 4-week follow-up. Specifically, higher baseline PTSD symptoms predicted improvement in total pain from baseline to 4-week follow-up after RT ($r = -.19$) compared to less improvement after WLC ($r = .33$). Additionally, baseline PTSD symptomatology predicted improvement in total pain from baseline to 4-week follow-up after EAET ($r = -.20$) compared to an association with less improvement after WLC ($r = .33$; see Figure 11).

PTSD symptoms also moderated the effects of treatment group (EAET vs. WLC) on IBS-related quality of life (b = .10, $t(100) = 1.91$, 95% CI [-.004, .20], $p = .06$) and interpersonal sensitivity (b = .17, $t(100) = 1.69$, 95% CI [-.03, .37], $p = .09$) at 4-week follow-up. Baseline PTSD symptoms predicted improvements in IBS-related quality of life from baseline to 4-weeks after EAET ($r = -.25$) compared to less improvement in quality of life following WLC ($r = .33$; see Figure 12). Baseline PTSD symptoms also predicted improvements in interpersonal sensitivity from baseline to 4-weeks following EAET ($r = -.30$) compared to less improvement after WLC ($r = .20$; see Figure 13). See Table 8 for correlations and significance for each condition.

Emotional Approach Coping. Emotional approach coping moderated the effects of treatment group (RT vs. WLC, b = -.48, $t(100) = -2.73$, 95% CI [-.83, -.13], $p < .001$; EAET vs. WLC, b = -.31, $t(100) = -1.69$, 95% CI [-.68, .06], $p = .09$) on depression at 12-week follow-up. This relationship was significant for RT vs. WLC, and marginally significant for EAET vs. WLC. Baseline emotional approach coping significantly predicted improvement in depression from baseline to 12-week follow-up after RT ($r = -.34$) compared to less improvement after WLC ($r = .27$). Baseline emotional approach coping also predicted improvement in depression at 12-week

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follow-up after EAET (r = -.15) compared to less improvement in depression following WLC (r = .27; see Figure 14).

Emotional approach to coping also significantly moderated the effects of treatment group (RT vs. EAET) on participants' rating of overall improvement in IBS symptoms (b = .26, t(100) = 2.17, 95% CI [.02, .50], p =.03), such that emotional approach coping predicted participant report of overall improvement in IBS symptoms from baseline to 4-week follow-up after RT (r = .23), compared to less improvement after EAET (r = -.27; see Figure 15). See Table 9 for correlations and significance for each condition.

Toronto Alexithymia Scale. Alexithymia significantly moderated the effects of treatment group (EAET vs. RT) on overall improvement in IBS symptoms as reported by participants (b = -5.04, t(100) = -2.24, CI [-9.49, -.58), p = .03), such that alexithymia at baseline predicted improvement in IBS symptoms from baseline to 4-week follow-up after RT (r = -.28) compared to less improvement following EAET (r = .23; see Figure 16). See Table 10 for correlations and significance for each condition.

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CHAPTER 4

DISCUSSION

Effect sizes for psychological treatments for IBS are modest, indicating that there may be subsets of patients who benefit differentially from certain interventions over others. The present study examined whether psychological and emotional factors moderate the effects of treatment group on health outcomes after two psychological interventions. Specifically, trauma, ambivalence over emotional expression, and general social constraints were examined to see whether they differentially predict improvements in health after Emotional Awareness and Expression Training (EAET), Relaxation Training (RT), and a Waitlist Control (WLC) condition. Findings from the study indicate that, overall, the hypothesized and exploratory moderators moderate the effects of treatment group on health outcomes for RT compared to WLC, but not EAET compared to RT or WLC as hypothesized. Specifically, although both interventions (EAET and RT) appeared to result in improved health outcomes at 1- and 12-week follow-up (Thakur et al., 2016), it seems that RT was especially helpful for certain individuals, which may indicate that EAET is more helpful to a greater number of patients with IBS while RT is differentially helpful for certain groups. These findings will be discussed in further detail below.

Trauma as a Moderator

Results did not support the hypothesis that participants with more childhood traumatic events would have greater improvements in health outcomes following EAET compared to RT and WLC. Among participants who had more childhood traumatic events, those in the RT group had more improvement in anxiety at 12-week follow-up compared to those in WLC or EAET. It is possible that those with greater amounts of childhood trauma had more physiological hyperarousal associated with anxiety, which was reduced by the relaxation techniques used in the

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RT condition. This finding was surprising, because it contradicts previous findings that indicate that a history of trauma or stressors predicts greater overall effects of disclosure relative to control (Frattaroli, 2006). It also does not support Lumley's (2004) model of who would benefit from emotional disclosure, which posits that those who have had stressful experiences would benefit from disclosing emotions. It is possible that participants with more or less trauma than the amount experienced by those in our sample would, in fact, benefit from disclosure. Further, it may be a result of the brief (i.e., 3-session) course of treatment, which may have unearthed difficult and painful emotions for those with a great deal of trauma, without the opportunity to continue exploring and resolving these emotions with the same therapist longer-term.

Ambivalence over Emotional Expression as a Moderator

Again, the hypothesis that those high in ambivalence over emotional expression would have greater improvement in health outcomes following EAET compared to RT and WLC was not supported. Rather, the two findings suggest moderation of the effects of RT, but not EAET. Those with high ambivalence showed greater reductions in depression at 4-week follow-up and interpersonal sensitivity at 1- and 12-week follow-up after RT, compared to WLC. Additionally, there were several marginal findings: those with higher ambivalence at baseline had greater reductions in total pain following RT compared to both EAET and RT, and those with higher ambivalence showed greater decreases in anxiety at 12-week follow-up after RT compared to EAET and greater decreases in interpersonal sensitivity at 12-week after RT compared to WLC.

Overall, these findings indicate that individuals with high ambivalence over emotional expression do better on multiple health outcomes after RT compared to WLC and EAET. These findings were most prominent in regards to psychological health outcomes (i.e., depression, anxiety, and interpersonal sensitivity) compared to pain outcomes. Ambivalence over emotional

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expression had previously been tested as a moderator of a treatment for chronic pain in only one other study (Norman et al., 2004), which found that ambivalence over emotional expression moderated health outcomes, such that participants with ambivalence benefited from disclosure, whereas those with ambivalence in the control condition showed worsening of symptoms. One hypothesis as to why individuals in our study who had greater ambivalence showed improved outcomes following RT vs. WLC, but not EAET vs. RT, is that people with greater ambivalence may be more anxious, and thus benefit more from a treatment (i.e., RT) aimed toward reducing anxiety. It is also possible that highly ambivalent people may find an intervention such as RT that does not require addressing their emotions to be more comfortable, desirable, or "fitting," given their personality, and thus respond well to it. Alternatively, those with low ambivalence did less well after RT, indicating that perhaps these individuals would prefer to address emotional issues related to their stress, but were not able to do so in RT.

General Social Constraints as a Moderator

The hypothesis that those high in social constraints would have greater improvements in health outcomes following EAET compared to RT and waitlist control was partially supported. Overall, social constraints moderated health outcomes following RT compared to WLC, with one additional finding showing that social constraints moderated IBS-quality of life following EAET compared to WLC. Social constraints moderated the effects of RT on IBS quality of life at 4-week follow-up compared to WLC and anxiety at 12-week follow-up compared to both EAET and WLC, such that individuals high in social constraints showed greater improvement in quality of life at 4-week compared to WLC and greater reduction in anxiety at 12-week follow-up compared to both EAET and WLC. Social constraints also moderated the effects of RT on IBS symptom severity at 4-week follow-up and interpersonal sensitivity at 12-week follow-up, such that those with high

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constraints showed greater improvement on both of these outcomes compared to WLC, but both of these findings were marginal. The one exception to the pattern of social constraints moderating the effects of RT but not EAET was IBS-related quality of life, and this finding was marginally significant. Social constraints moderated IBS-related quality of life, such that those with high social constraints showed more improved IBS-related quality of life following EAET compared to WLC.

These findings about social constraints mirror those related to trauma and ambivalence over emotional expression: social constraints appears to moderate the effects of RT, but not EAET. It was unclear how social constraints would moderate the effects of these treatment interventions, because social constraints had never been examined as a moderator, yet these findings contradicted the theoretical expectation that those who feel less able to share thoughts and feelings with others may especially benefit from an emotional disclosure intervention. Similar to the findings with ambivalence over emotional expression, it is possible that social constraints is a proxy for anxiety, and thus those with high social constraints differentially benefit from an intervention (RT) that aims to reduce anxiety compared to their less socially constrained counterparts.

The significant correlation between social constraints and ambivalence over emotional expression (r = .41, see Table 1) also points to another possibility: that people high in social constraints and ambivalence have in common a discomfort with, lack of readiness, fear, or reluctance to engage in emotionally expressive interventions. Although we hypothesized that these individuals would do better in interventions aimed at increasing emotional expression, it could be the case that people high in these constraints prefer RT and, in fact, do well with it, whereas those low in these constructs, who prefer or see the value in engaging emotions and disclosing emotions, do less well with RT because they want or need to address emotions. However, this explanation

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of why people high in social constraints do well in RT compared to their less socially constrained counterparts does not explain why, conversely, people high in social constraints do not do more poorly in EAET compared to people low in social constraints. It is possible that EAET is conducted in such a manner that the therapist adjusts the level of intensity as needed to suit the personality of the patient.

Additional Moderation Analyses

Overall, results from the additional moderation analyses reveal similar findings as our primary hypotheses: impact of events (PTSD symptomatology), emotional approach coping, and alexithymia all moderate the effects of RT, but not EAET or WLC, on outcomes. One notable exception is with impact of events. Impact of events moderated effects of both RT and EAET, such that those with higher baseline PTSD symptoms showed more improvement in pain at 4-week following both RT and EAET compared to WLC. Additionally, those with higher baseline PTSD symptoms showed greater improvement in IBS-related quality of life and interpersonal sensitivity following EAET compared to WLC. This may suggest that, for those who have been more negatively and persistently affected by trauma, receiving either type of treatment is especially beneficial compared to receiving no treatment at all. This may be because IES is an indicator of psychopathology (i.e., PTSD) as opposed to other moderators included in this study, which measure variations in non-pathological emotion and personality variables. Thus, those with higher levels of psychopathology differentially benefit from receiving any type of therapy.

Emotional approach coping moderated treatment effects in a similar way: overall, RT was differentially beneficial in terms of depression and overall improvement outcomes for people high in emotional approach coping. Interestingly, emotional approach coping also moderated the effects of EAET on depression, such that those higher in emotional approach coping received more

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benefit in terms of improved depression at 12-week follow-up after EAET, compared to WLC. These findings somewhat contradict the hypothesis that those who show interest in and readiness for emotional engagement and expression do best with EAET, because these participants seemed to better with *both* treatment groups. This provides some evidence that perhaps individuals high in emotional engagement have better therapy outcomes overall.

Finally, alexithymia was found to moderate the effects of treatment group on overall improvement in IBS symptoms at 4-week follow-up, such that those with higher alexithymia received differential benefit from RT compared to less benefit from EAET. This finding is consistent with findings regarding general social constraints and ambivalence over emotional expression, lending more support to the hypothesis that those who, for various reasons, prefer not to or cannot engage with emotional content and expression may prefer and benefit more from RT compared to EAET.

Limitations

One limitation of this study is the small sample size (namely, less than 40 participants in each treatment condition). These analyses had many marginally significant findings, which may be a result of the small sample sizes, and may have been clarified with a greater number of participants. Furthermore, participants in this sample were relatively heterogeneous, and demographics such as race and gender and disease characteristics such as duration of diagnosis and disease severity may also play a role in which individuals improve from which treatments, although these were not examined in this study. Moreover, such heterogeneity on these other characteristics likely increases the challenge of identifying other, psychological moderators, which can become "lost" in the substantial variance in the participants.

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As with other treatment intervention studies, the findings in this study apply only to the treatments used in this study (i.e., EAET and RT). This is true not only of the content of the treatments, but also their length and modality. Of note is that each intervention was conducted one-on-one and was relatively brief (i.e., three 50-minute sessions). This does not necessarily mirror other treatment settings, and thus findings are only generalizable to a brief course of treatment in an individual format. Additionally, findings are only generalizable to individuals with IBS; individuals with other chronic pain conditions may show different responses to the treatments used in this study.

An additional limitation of this study is the overlap among several of the emotion-related variables. It can be speculated based on the high correlations (see Table 1) and similar moderating effects that variables such as ambivalence over emotional expression, general social constraints, and alexithymia all tap into the same construct: reluctance or inability to engage with and express emotions. Furthermore, moderators were tested on multiple outcomes and were found to be significant across varying outcomes (rather than one or two consistent outcomes), which may convolute the interpretation of our findings. We also tested several moderators, increasing the possibility of a Type I error. Finally, although most moderator and outcome measures had high reliability coefficients, the IBS symptom severity measure showed weak reliability (α = .46), which may partially explain why only one moderator predicted outcomes on this measure.

Future Directions

Future studies should examine other potential moderators of EAET and RT, so that we can continue to clarify which patients are best suited to different treatments. Such moderators could include demographic factors or other psychological or emotional variables, such as readiness to change. Based on the findings in the current study, it can be hypothesized that those with a high

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readiness to change, and further, readiness to engage in emotional engagement and expression, may differentially benefit from EAET and RT. Social variables were not thoroughly assessed in this study, yet based on the strong moderation effect of social constraints on outcomes, social variables may yield further insight into which treatments benefit which patients, and should be examined in future research. For example, individuals with more social contacts or perceived higher-quality social support may benefit more from EAET compared to RT because of their possible familiarity and comfort with emotional disclosure and expression. More research is also needed to clarify the effects of certain key moderators, such as social constraints, on treatment outcomes in IBS and other chronic pain populations. Future research should also examine the effect of trauma, social constraints, ambivalence over emotional expression, and other psychological variables on treatment outcomes in other pain populations, such as fibromyalgia, chronic pelvic pain, or chronic headaches.

Additional studies should examine what mechanisms are at play in the effectiveness of treatments for IBS. Understanding what techniques or processes (mediators) in EAET or RT affect outcomes will help us to more easily identify which types of patients fit more clearly into what types of processes. Additionally, further research should clarify why the moderator variables in this study moderate effects of treatment on outcomes, and particularly moderate the effects of RT on outcomes. The present study proposed some hypotheses that could be explored in future studies—for example, that individuals with high social constraints, ambivalence over emotional expression, and alexithymia benefit more from RT because of a common reluctance or difficulty with engaging in and expression emotions, thus making RT more attractive and effective. Better understanding the processes underlying these moderation effects will allow researchers to hone

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measurement in their studies and will help clinicians to identify best treatment approaches for different individuals based on important baseline factors.

Implications

The findings from this study indicate that relaxation training may be more effective for certain types of people, whereas EAET may be more helpful across the board. Although both interventions (RT and EAET) appeared to generally result in improved health outcomes at 1- and 12-week follow-up, it seems that RT was especially helpful for certain individuals, particularly those who are high in ambivalence over emotional expression and social constraints. This may indicate that EAET is more helpful to a greater number of patients with IBS, whereas RT is differentially helpful for certain groups. The commonality here may be anxiety, suggesting that perhaps more anxious IBS patients disproportionately benefit from RT compared to their less anxious counterparts. Or, it is possible that many of the moderators tested in this study (i.e., ambivalence, social constraints, and alexithymia) share a common underlying construct of lack of readiness for or fear of emotional work. Although one could speculate that individuals with a fear of engaging in emotions would quite benefit from an emotion-related intervention, this study indicates that, in fact, these individuals do better with an intervention such as RT. This supports the notion that fitting interventions to individuals' current strengths and preferences may yield best possible outcomes.

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APPENDIX

TABLES & FIGURES

Table 1

Sample and Treatment Condition Demographic Data

		Full Sample (n = 106)	EAET (n = 36)	RT (n = 36)	TAU (n = 34)	F/χ^2 Value	p -value
Age (years)	*M (SD)*	36.14 (16.42)	40.36 (17.89)	34.11 (15.22)	33.82 (15.58)	1.83	.17
Gender						0.02	.99
Male	*n* (%)	21 (19.8)	7 (19.4)	7 (19.4)	7 (20.6)		
Female	*n* (%)	85 (80.2)	29 (80.6)	29 (80.6)	27 (79.4)		
Ethnicity						0.73	.70
European American	*n* (%)	69 (65.1)	22 (61.1)	23 (63.9)	24 (70.6)		
African American	*n* (%)	24 (22.6)	7 (19.4)	9 (25.0)	8 (23.5)		
Middle Eastern	*n* (%)	4 (3.8)	2 (5.6)	0 (0)	2 (5.9)		
South Asian	*n* (%)	3 (2.8)	2 (5.6)	1 (2.8)	0 (0)		
East Asian	*n* (%)	2 (1.9)	2 (5.6)	0 (0)	0 (0)		
Other	*n* (%)	4 (3.8)	1 (2.8)	3 (8.3)	0 (0)		
Marital Status	*n* (%)					4.32	.12
Married	*n* (%)	29 (27.4)	15(41.7)	7 (19.4)	7 (20.6)		
Living with Partner	*n* (%)	5 (4.7)	0 (0)	0 (0)	5 (14.7)		
Divorced	*n* (%)	8 (7.5)	3(8.3)	2 (5.6)	3 (8.8)		
Separated	*n* (%)	2 (1.9)	0 (0)	2 (5.6)	0 (0)		
Widowed	*n* (%)	1 (0.9)	1(2.8)	0 (0)	0 (0)		
Never Married	*n* (%)	61 (57.5)	17(47.2)	25 (69.4)	19 (55.9)		
Duration of Symptoms	*M (SD)*	22.90 (12.84)	23.47 (12.83)	23.58 (12.78)	21.57 (13.21)	0.26	.77

Note. All tests were 2-tailed. M = mean; SD = standard deviation;
Chi-square analysis for ethnicity was analyzed comparing only European American to Other (all non-European Americans), due to the small numbers of non-European Americans in the dataset.
Chi-square analysis for marital status compared only Partner (married or living together with a significant other) to Other (single, separated, divorced, widowed), due to the small numbers of non-partnered individuals in the dataset.

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Table 2

Comparison of Group Means and Adjusted Means on Outcome Measures at 4-week and 12-week Follow-ups

Outcome Measure	Time Point	Emotional Awareness and Expression Training (n = 36)	Relaxation Training (n = 36)	Control Group (n = 34)	F-value	p – value
Symptom Severity	Baseline M (SD)	5.46(1.76)	5.24(1.50)	5.26(1.66)	0.21	.82
	4-week M (SD)	3.74(1.81)	4.13(1.46)	4.83(1.91)		
	12-week M (SD)	3.56(2.27)	3.77(2.0)	4.55(2.22)		
	4-wk Adj. M (SE)	3.67(0.26)[a]	4.17(0.26)[ab]	4.86(0.27)[b]	5.18	.007
	12-wk Adj. M (SE)	3.48(0.32)[a]	3.82(0.32)[ab]	4.59(0.33)[b]	3.00	.054
Quality of Life (Poor)	Baseline M (SD)	2.41(0.57)	2.65(0.80)	2.43(0.81)	1.23	.30
	4-week M (SD)	2.05(0.53)	2.34(0.73)	2.50(0.83)		
	12-week M (SD)	1.94(0.58)	2.14(0.78)	2.37(0.76)		
	4-wk Adj. M (SE)	2.12(0.07)[a]	2.22(0.07)[a]	2.55(0.07)[b]	9.86	<.001
	12-wk Adj. M (SE)	2.00(0.10)[a]	2.06(0.10)[a]	2.39(0.10)[b]	4.41	.02
Anxiety	Baseline M (SD)	0.97(0.76)	0.97(0.76)	1.09(0.83)	0.47	.63
	4-week M (SD)	0.68(0.72)	0.62(0.67)	1.20(0.91)		
	12-wk M (SD)	0.78(0.93)	0.56(0.61)	1.01(0.86)		
	4-wk Adj. M (SE)	0.73(0.11)[a]	0.62(0.11)[a]	1.14(0.11)[b]	6.50	.002
	12-wk Adj. M (SE)	0.83(0.11)[ab]	0.56(0.11)[a]	0.95(0.12)[b]	3.02	.053
Depression	Baseline M (SD)	0.61(0.63)	0.93(0.87)	1.02(0.91)	2.54	.08
	4-week M (SD)	0.64(0.70)	0.60(0.74)	1.22(1.17)		
	12-week M (SD)	0.56(0.70)	0.55(0.70)	0.95(1.07)		
	4-wk Adj. M (SE)	0.84(0.10)[b]	0.53(0.10)[a]	1.09(0.11)[b]	7.13	.001
	12-wk Adj. M (SE)	0.74(0.10)[ab]	0.49(0.10)[a]	0.83(0.10)[b]	2.94	.057
Hostility	Baseline M (SD)	0.69(0.67)	0.79(0.60)	0.85(0.78)	0.48	.62
	4-week M (SD)	0.54(0.67)	0.63(0.52)	0.92(0.93)		
	12-week M (SD)	0.56(0.79)	0.50(0.46)	0.70(0.83)		
	4-wk Adj. M (SE)	0.60(0.09)[a]	0.62(0.09)[ab]	0.87(0.09)[b]	2.62	.08
	12-wk Adj. M (SE)	0.61(0.09)	0.49(0.09)	0.65(0.09)	0.86	.43

Note: Note. All tests were 2-tailed. M = mean; SD = standard deviation;
Adjusted means with different superscripts differ significantly according to Fisher's LSD post-hoc tests

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Table 3

Means, Standard Deviations, and Bivariate Correlations for Potential Moderator Measures (N = 106)

	Correlations					
	1	2	3	4	5	6
1. Trauma	--	.24*	.38**	.37**	.17	-.18
2. Ambivalence over Emotional Expression		--	.41**	.44**	.60**	-.40**
3. General Social Constraints			--	.44**	.24*	-.21*
4. Impact of Events				--	.33**	-.13
5. Toronto Alexithymia Scale					--	-.61**
6. Emotional Approach Coping						--
Mean	8.5	3.08	35.02	4.20	50.52	2.55
Standard Deviation	5.47	0.81	9.88	2.22	12.25	0.67
Range	0-23	1.1-4.9	15-55	0-11.3	26-78	1-4

*$p < .05$; **$p < .01$

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Table 4

Descriptive Data for Outcome Variables

Outcome (Change scores)	**Time from baseline**	***N***	***M***	***SD***	**Min**	**Max**
Total Pain	4-week	105	-.48	1.45	-4.5	4.95
	12-week	106	.02	1.35	-3.18	5.64
IBS-SSS	4-week	106	-1.10	1.81	-6.6	3.80
	12-week	106	-.27	1.58	-5.00	5.40
IBS-QOL	4-week	106	-.21	.49	-1.71	1.06
	12-week	106	-.36	.70	-2.24	1.38
BSI-Depression	4-week	106	-.04	.66	-2.33	2.00
	12-week	106	-.13	.49	-2.17	2.00
BSI-Anxiety	4-week	106	-.16	.75	-2.50	1.83
	12-week	106	-.05	.56	-2.17	1.67
BSI-Interpersonal Sensitivity	4-week	106	-.10	.89	-3.00	2.50
	12-week	106	-.21	.96	-3.42	2.75
Global Change	4-week	106	4.62	1.31	1	1
	12-week	106	4.63	1.48	7	7

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Table 5

Correlations between Trauma and Changes in Outcome Measures for each of the Three Treatment Conditions

		EAET *N* = 37	RT *N* = 36	WLC *N* = 33
Total Pain	4-week	0.06	0.12	0.27
	12-week	-0.16	-0.05	0.12
IBS-SSS	4-week	-0.10	-0.11	0.10
	12-week	0.009	-0.002	-0.07
IBS-QOL	4-week	0.00	0.11	0.13
	12-week	-0.01	-0.03	0.03
BSI-Depression	4-week	0.14	-0.11	0.22
	12-week	0.13	-0.02	0.06
BSI-Anxiety	4-week	-0.01	0.26	0.19
	12-week	0.26_a	-0.21_b	0.27_a
BSI-Interpersonal Sensitivity	4-week	-0.03	0.07	0.15
	12-week	0.04	0.02	0.20
Global Change	4-week	-0.15	0.04	-0.21
	12-week	-0.13	-0.01	-0.16

*$p < .05$; **$p < .01$; ***$p < .001$
Note: See text for which conditions differ from each other.

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Table 6

Correlations between Ambivalence over Emotional Expression and Changes in Outcome Measures for each of the Three Treatment Conditions

		EAET *N* = 37	RT *N* = 36	WLC *N* = 33
Total Pain	4-week	0.06	-.37*	0.05
	12-week	-0.06	0.00	-0.01
IBS-SSS	4-week	-0.18	-0.20	-0.01
	12-week	0.01	-0.08	-0.05
IBS-QOL	4-week	-0.12	-0.36*	-0.21
	12-week	-0.06	-0.11	-0.26
BSI-Depression	4-week	-0.12	-0.35*	0.08
	12-week	0.08	-0.12	-0.18
BSI-Anxiety	4-week	-0.14	-0.17	-0.23
	12-week	0.23	-0.20	-0.12
BSI-Interpersonal Sensitivity	4-week	-0.35	-0.37	0.07
	12-week	-0.13	-0.35	0.02
Global Change	4-week	0.20	-0.01	0.22
	12-week	0.06	-0.05	0.20

*$p < .05$; **$p < .01$; ***$p < .001$
Note: See text for which conditions differ from each other.

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Table 7

Correlations between General Social Constraints and Changes in Outcome Measures for each of the Three Treatment Conditions

		EAET *N* = 37	RT *N* = 36	WLC *N* = 33
Total Pain	4-week	-0.05	-0.10	.40*
	12-week	0.07	0.06	0.16
IBS-SSS	4-week	-0.01	-.36*	.36*
	12-week	0.07	0.06	-0.18
IBS-QOL	4-week	-0.22	-0.37*	0.28
	12-week	-0.22	-0.30	0.08
BSI-Depression	4-week	-0.06	-0.23	0.07
	12-week	0.01	-0.11	0.08
BSI-Anxiety	4-week	-0.21	0.16	-0.18
	12-week	0.20	-0.42*	0.41*
BSI-Interpersonal Sensitivity	4-week	-0.30	-0.10	-0.01
	12-week	0.03	-0.25	0.18
Global Change	4-week	0.20	0.09	-0.16
	12-week	-0.04	-0.05	-0.24

*$p < .05$; **$p < .01$; ***$p < .001$
Note: See text for which conditions differ from each other.

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Table 8

Correlations between Impact of Events and Changes in Outcome Measures for each of the Three Treatment Conditions

		EAET *N* = 37	RT *N* = 36	WLC *N* = 33
Total Pain	4-week	-0.20	-0.19	0.33
	12-week	0.22	0.33	0.28
IBS-SSS	4-week	-0.08	-0.01	0.16
	12-week	0.03	0.24	0.15
IBS-QOL	4-week	-0.25	-0.18	0.24
	12-week	-0.16	0.19	0.08
BSI-Depression	4-week	-0.10	-0.10	0.10
	12-week	0.08	-0.20	0.08
BSI-Anxiety	4-week	-0.29	-0.13	0.08
	12-week	-0.02	-0.16	0.06
BSI-Interpersonal Sensitivity	4-week	-0.30	-0.10	0.20
	12-week	0.01	-0.18	0.27
Global Change	4-week	0.23	0.14	0.03
	12-week	-0.03	-0.15	-0.25

*$p < .05$; **$p < .01$; ***$p < .001$
Note: See text for which conditions differ from each other.

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Table 9

Correlations between Emotional Approach Coping and Changes in Outcome Measures for each of the Three Treatment Conditions

		EAET *N* = 37	RT *N* = 36	WLC *N* = 33
Total Pain	4-week	-0.22	-0.24	0.12
	12-week	0.00	-0.11	0.11
IBS-SSS	4-week	-0.04	0.05	-0.27
	12-week	0.16	-0.05	0.10
IBS-QOL	4-week	0.01	-0.11	0.16
	12-week	0.04	0.02	0.26
BSI-Depression	4-week	0.12	0.32	0.02
	12-week	-0.15	-0.34*	0.27
BSI-Anxiety	4-week	0.08	-0.10	0.08
	12-week	-0.02	-0.10	0.07
BSI-Interpersonal Sensitivity	4-week	0.17	0.10	-0.01
	12-week	0.10	-0.07	-0.03
Global Change	4-week	-0.27	0.23	-0.17
	12-week	-0.08	0.10	0.14

*$p < .05$; **$p < .01$; ***$p < .001$
Note: See text for which conditions differ from each other.

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Table 10

Correlations between Alexithymia and Changes in Outcome Measures for each of the Three Treatment Conditions

		EAET *N* = 37	RT *N* = 36	WLC *N* = 33
Total Pain	4-week	0.12	0.09	-0.14
	12-week	0.23	0.03	0.03
IBS-SSS	4-week	-0.03	-0.01	0.02
	12-week	0.06	0.05	-0.03
IBS-QOL	4-week	0.04	-0.03	-0.14
	12-week	0.17	-0.01	-0.14
BSI-Depression	4-week	-0.23	-0.21	0.07
	12-week	0.18	0.04	-0.23
BSI-Anxiety	4-week	-0.12	0.08	-0.16
	12-week	-0.02	-0.12	-0.18
BSI-Interpersonal Sensitivity	4-week	-0.33	-0.07	0.12
	12-week	-0.29	-0.12	0.05
Global Change	4-week	0.23	-0.28	0.08
	12-week	0.03	-0.29	0.12

*$p < .05$; **$p < .01$; ***$p < .001$

Note: See text for which conditions differ from each other.

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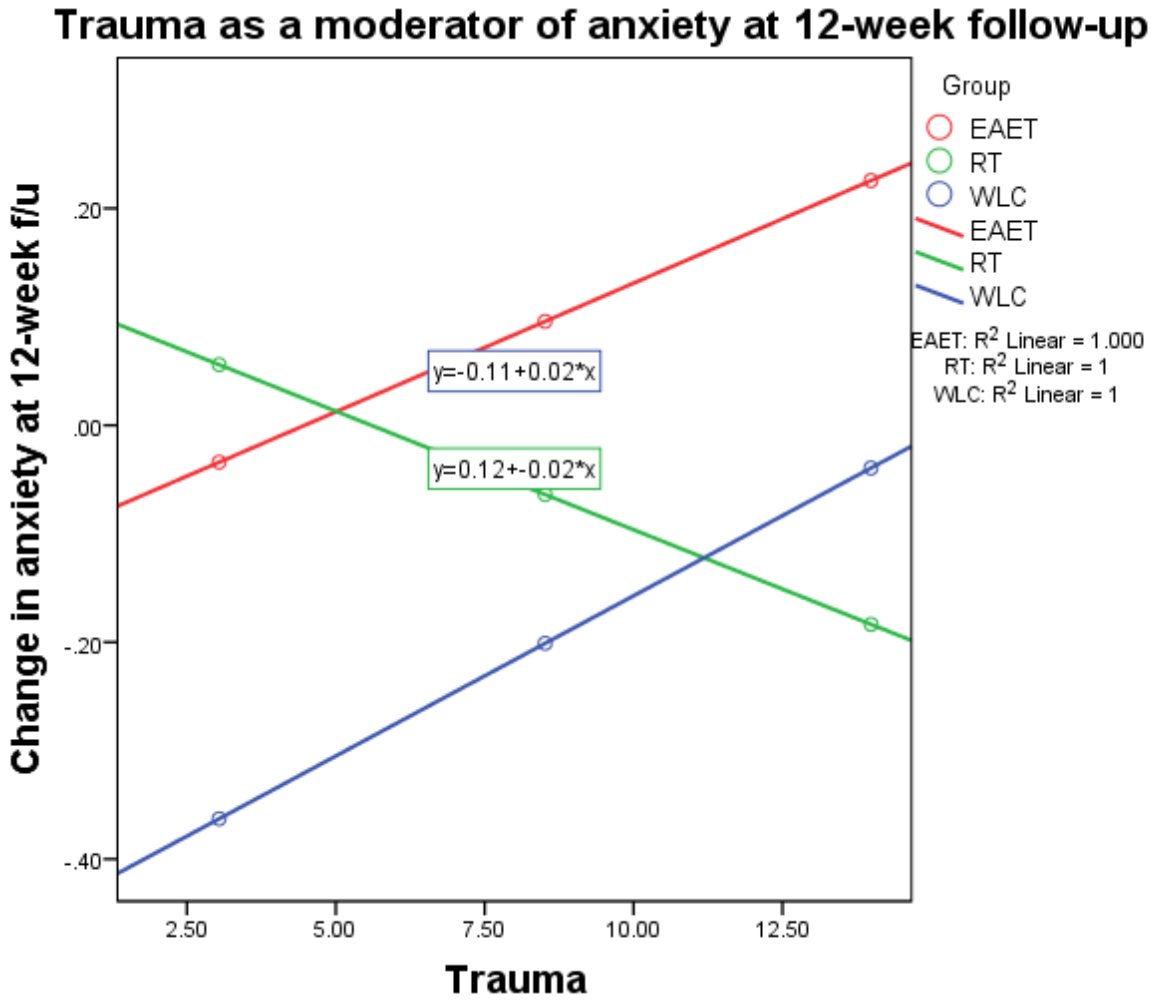

Figure 1. Trauma as a moderator of anxiety at 12-week follow-up.

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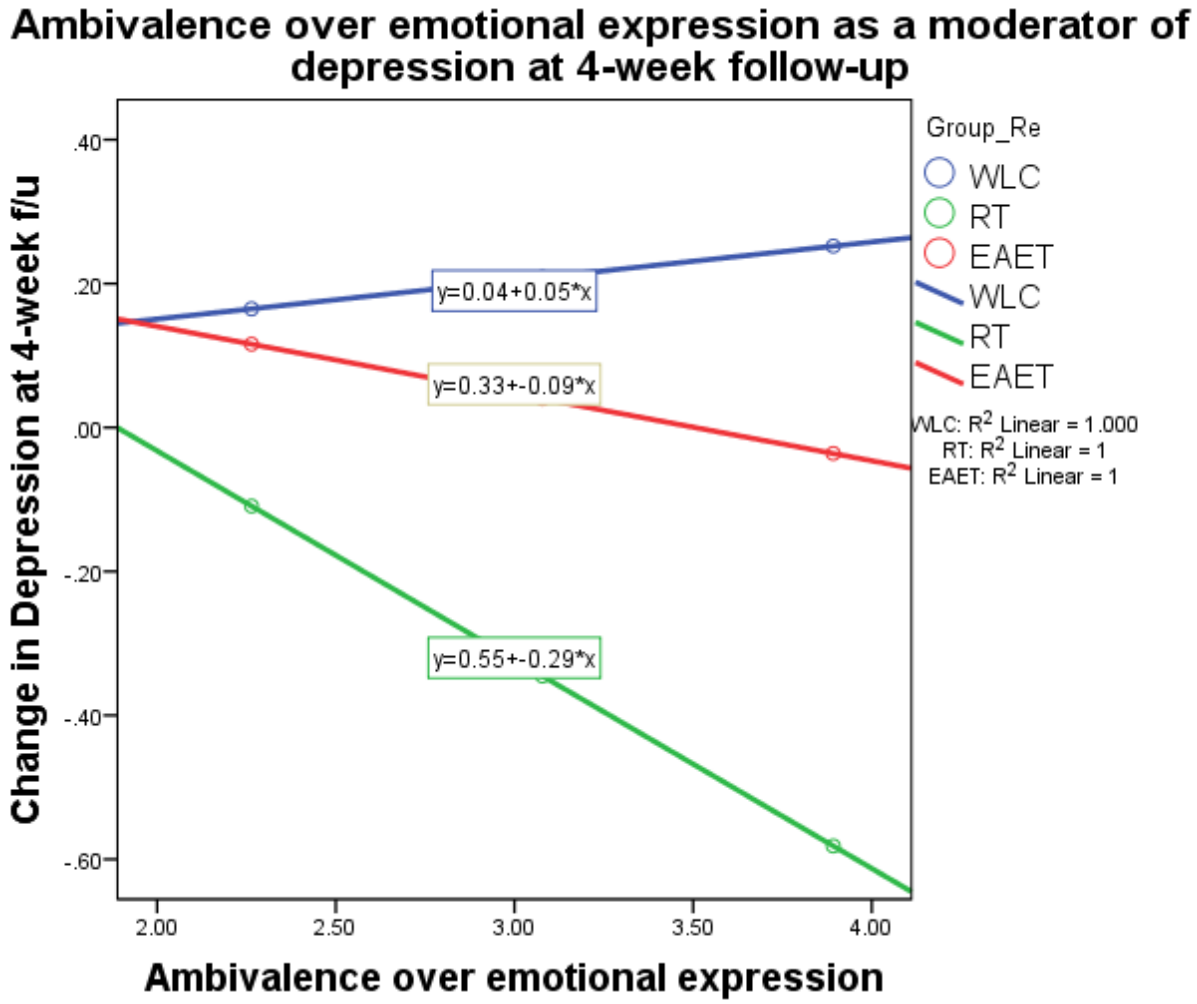

Figure 2. Ambivalence over emotional expression as a moderator of depression at 4-week follow-up.

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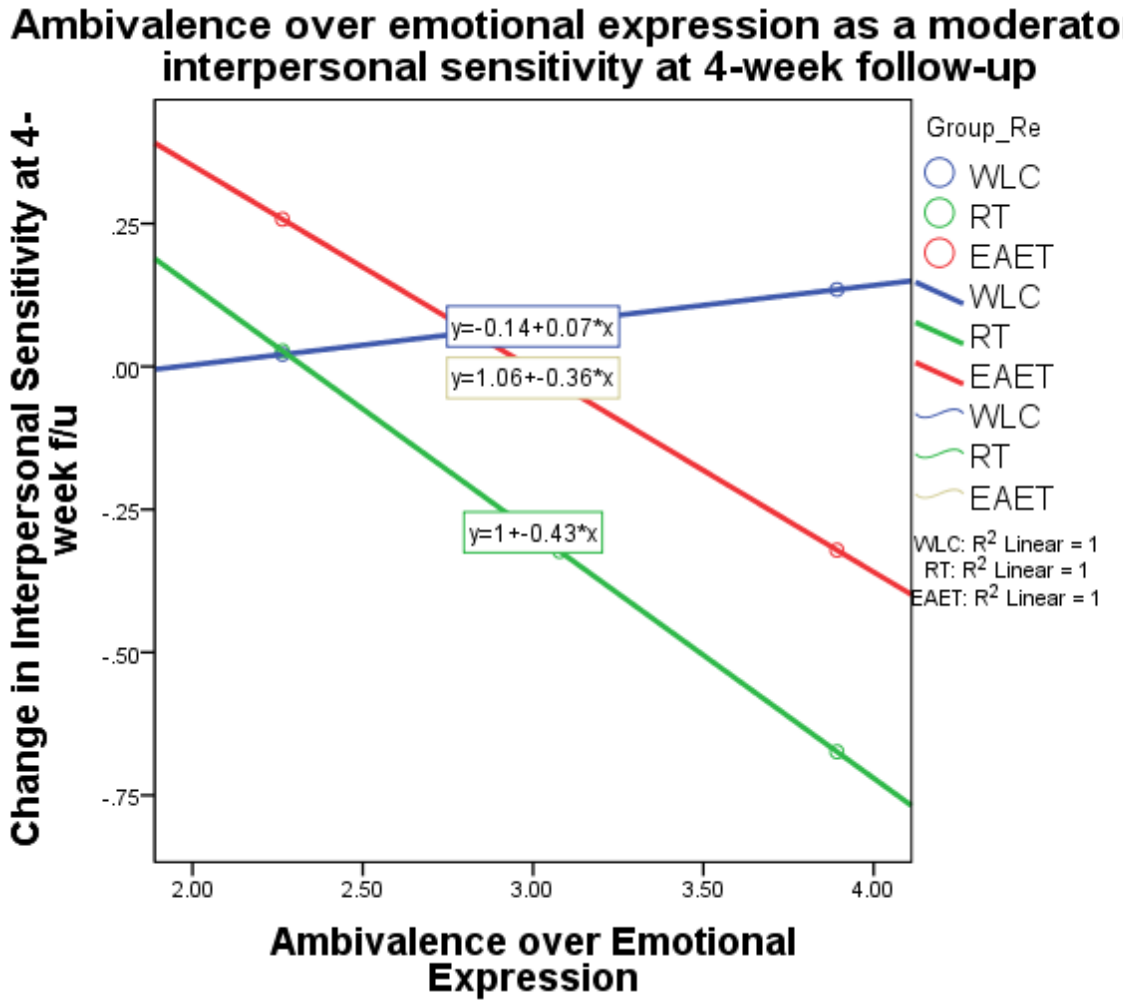

Figure 3. Ambivalence over emotional expression as a moderator of interpersonal sensitivity at 4-week follow-up.

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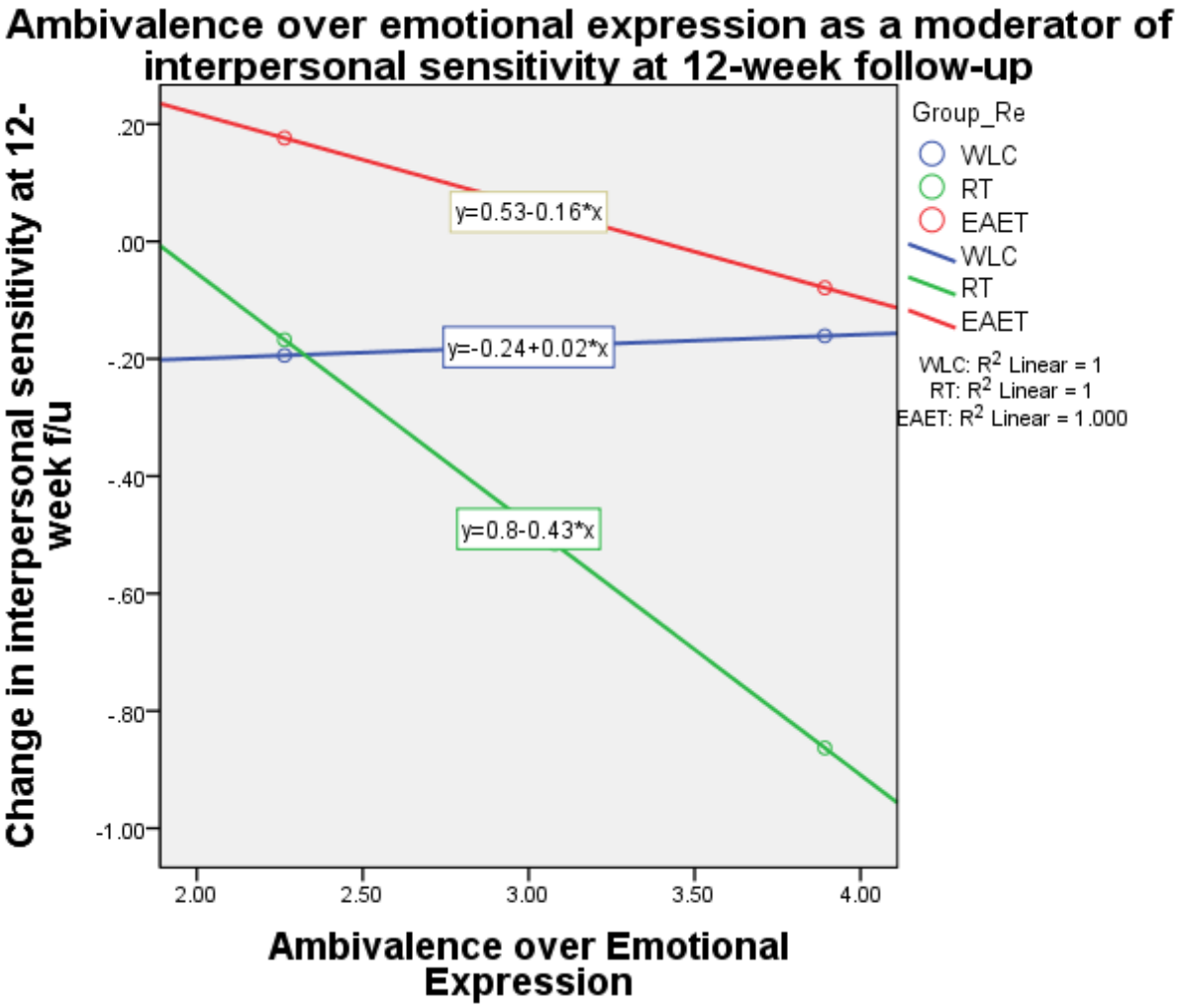

Figure 4. Ambivalence over emotional expression as a moderator of interpersonal sensitivity at 12-week follow-up.

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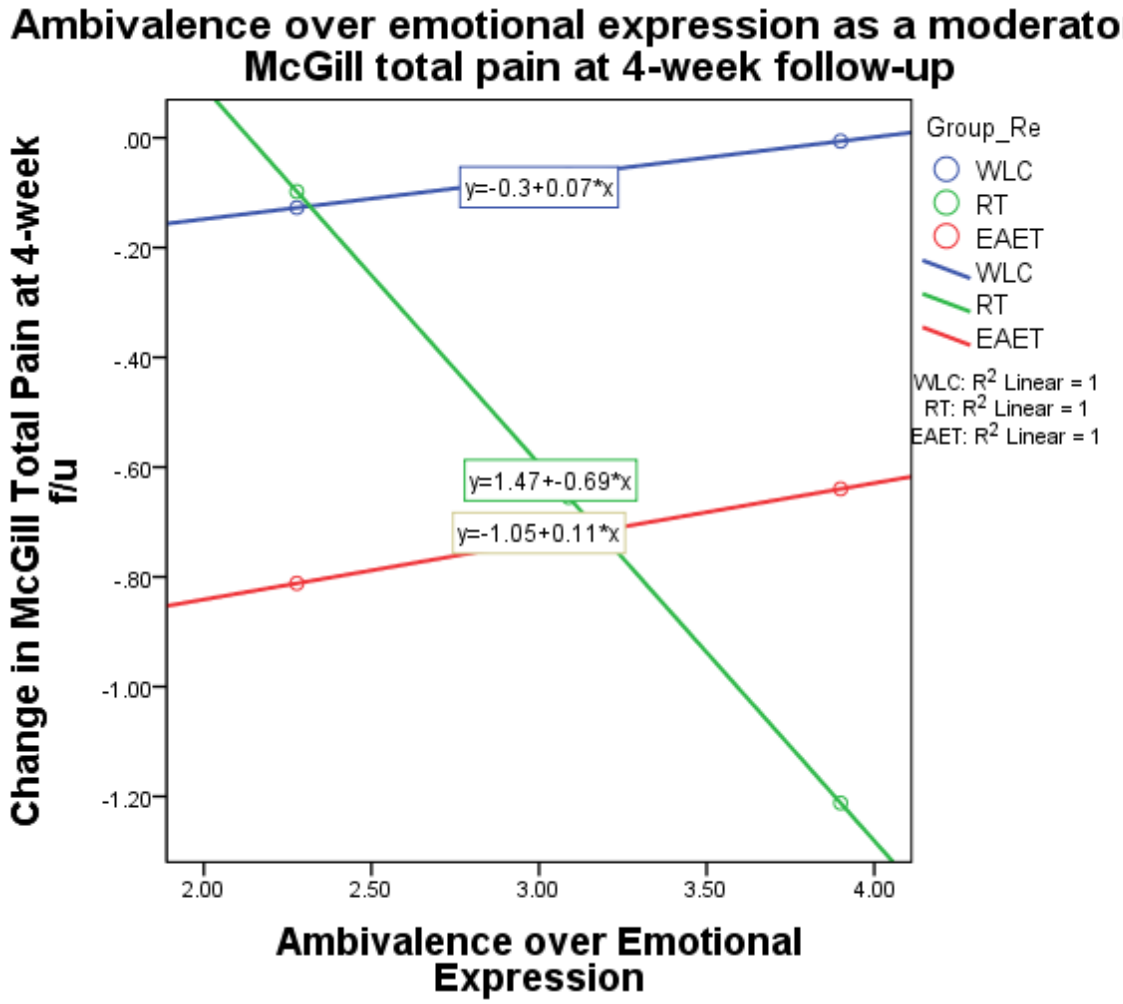

Figure 5. Ambivalence over emotional expression as a moderator of McGill total pain at 4-week follow-up.

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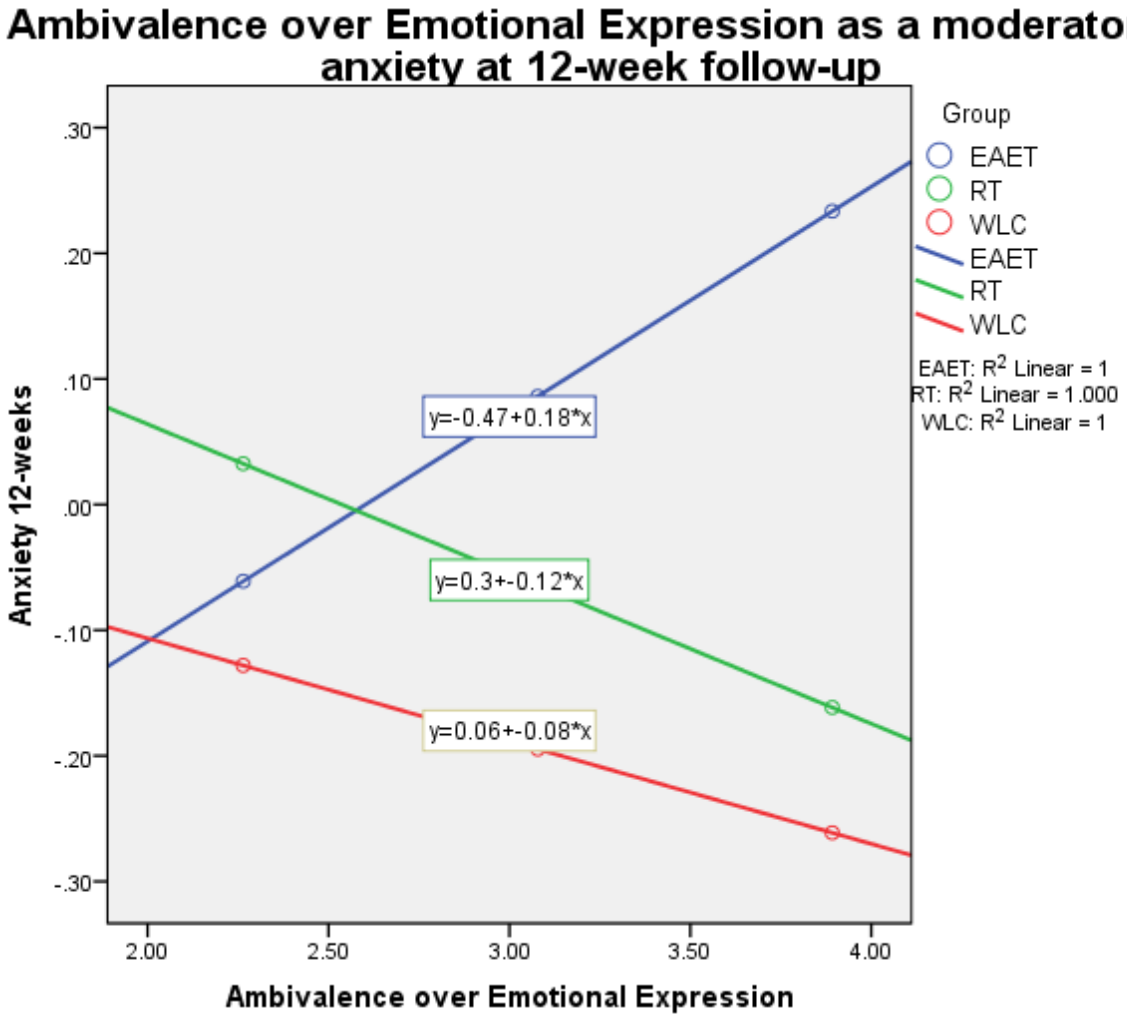

Figure 6. Ambivalence over emotional expression as a moderator of anxiety at 12-week follow-up.

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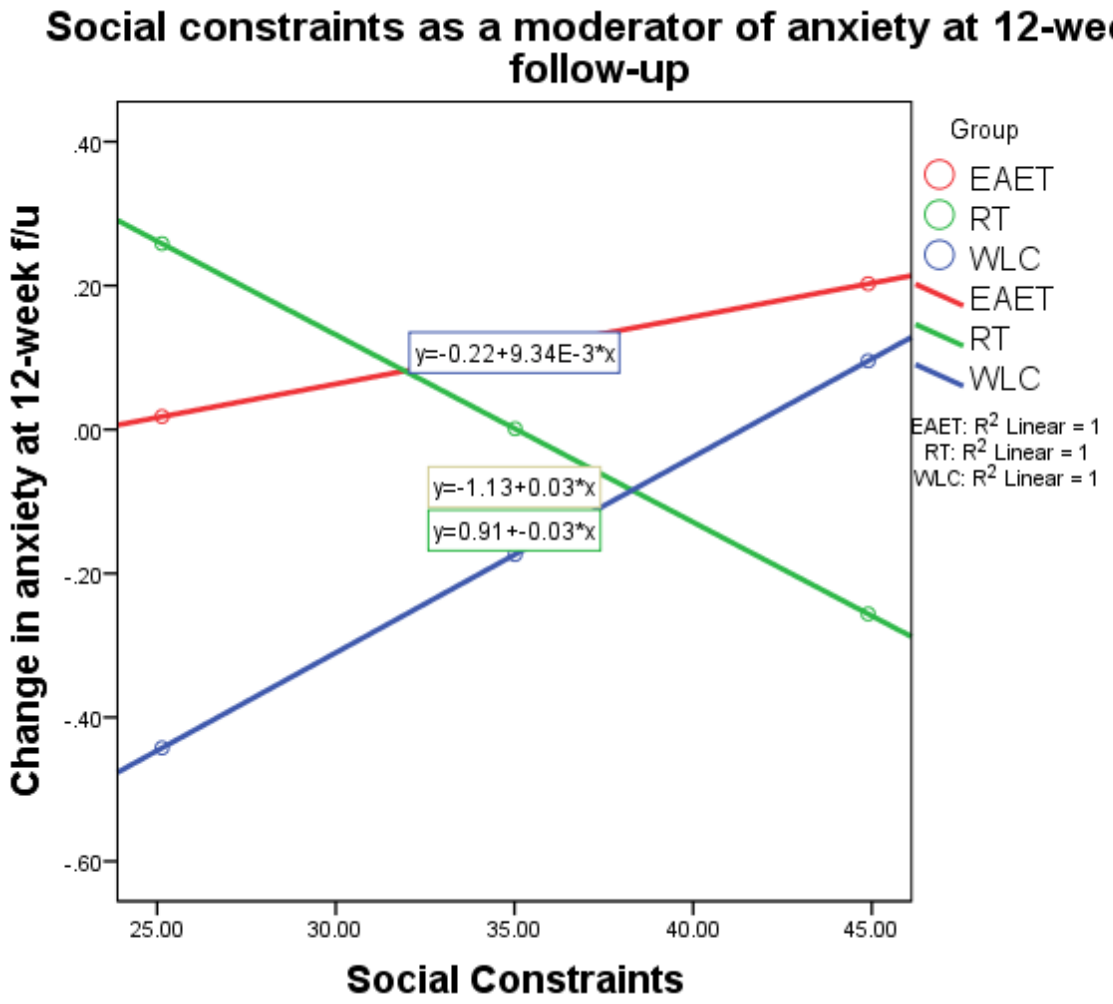

Figure 7. Social constraints as a moderator of anxiety at 12-week follow-up.

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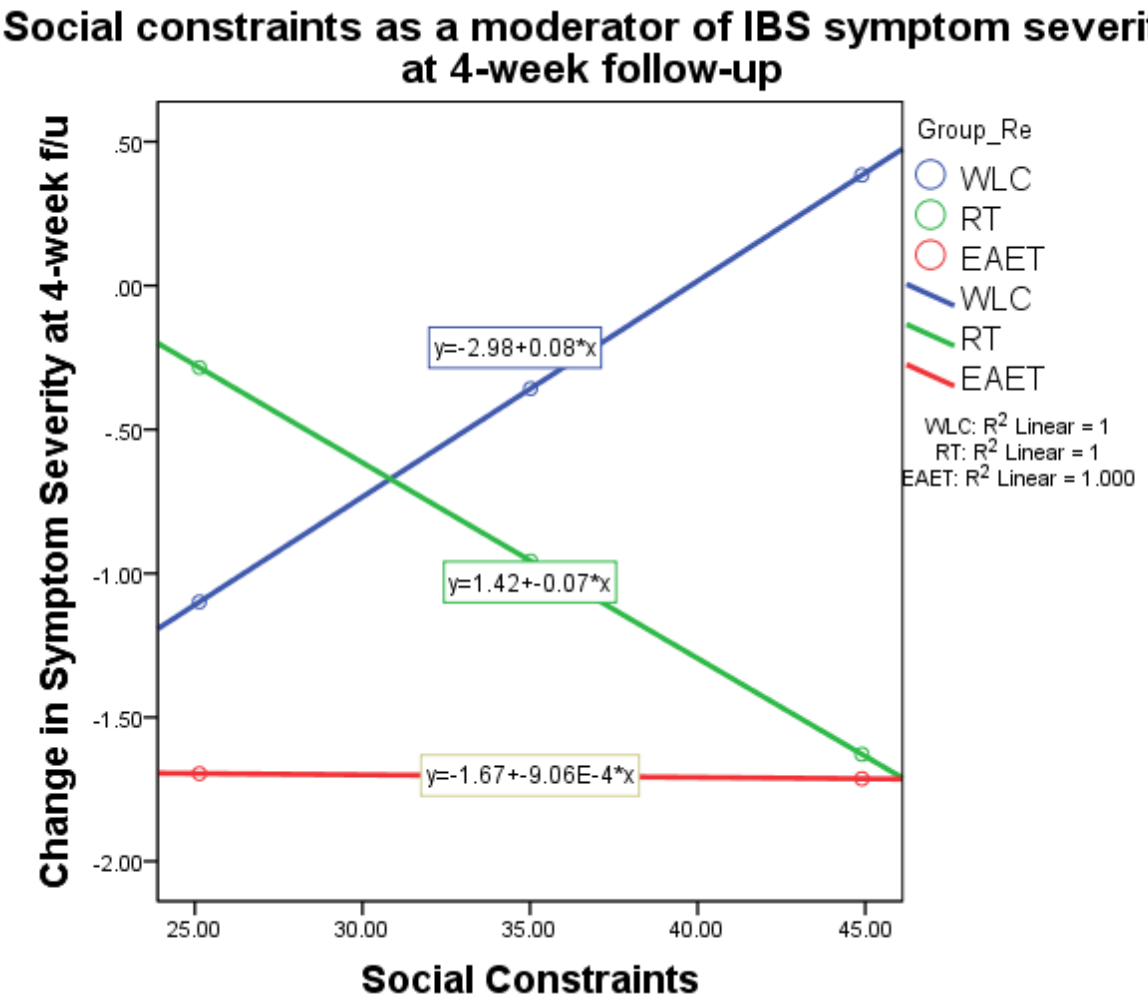

Figure 8. Social constraints as a moderator of IBS symptom severity at 4-week follow-up.

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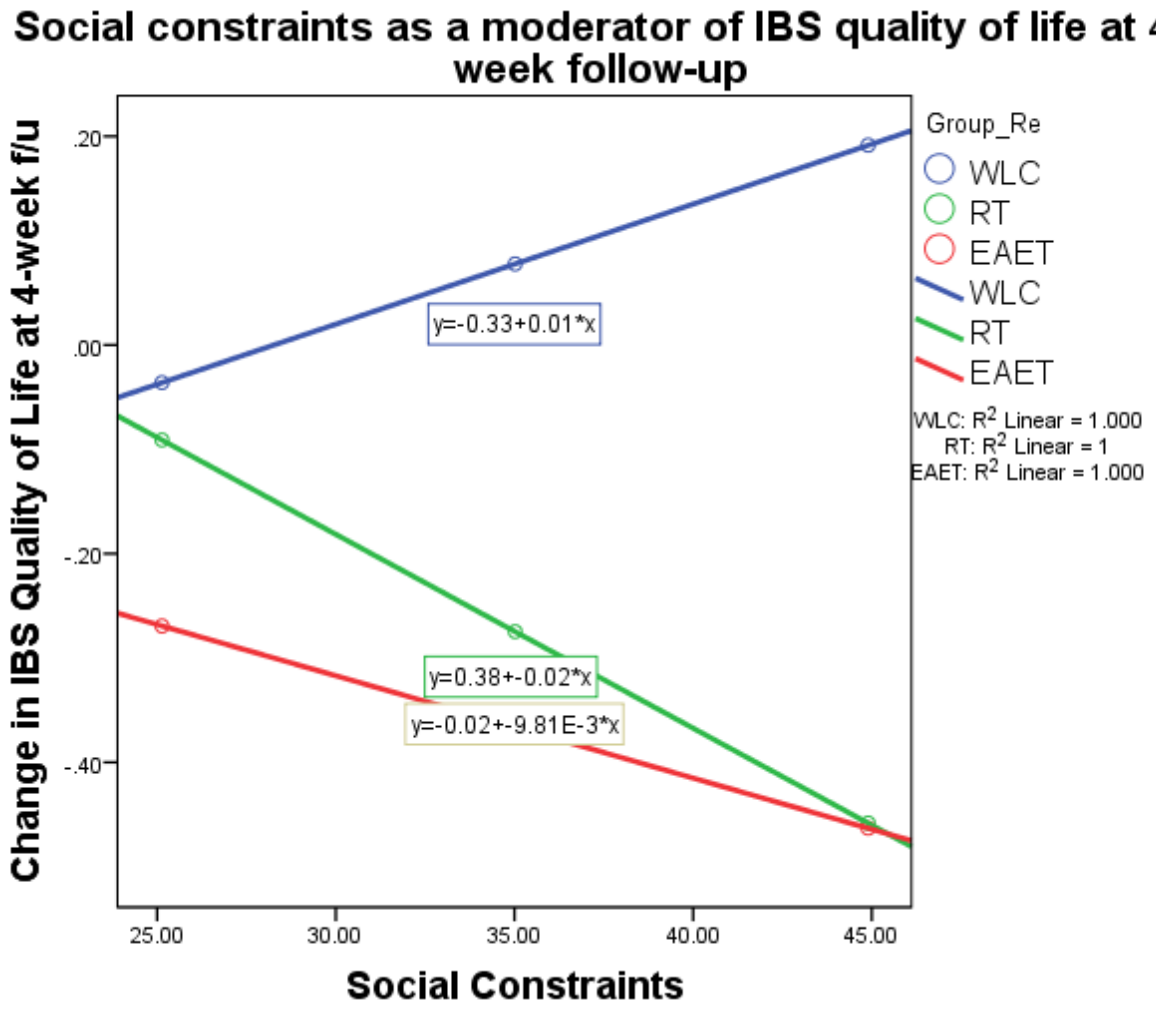

Figure 9. Social constraints as a moderator of IBS quality of life at 4-week follow-up.

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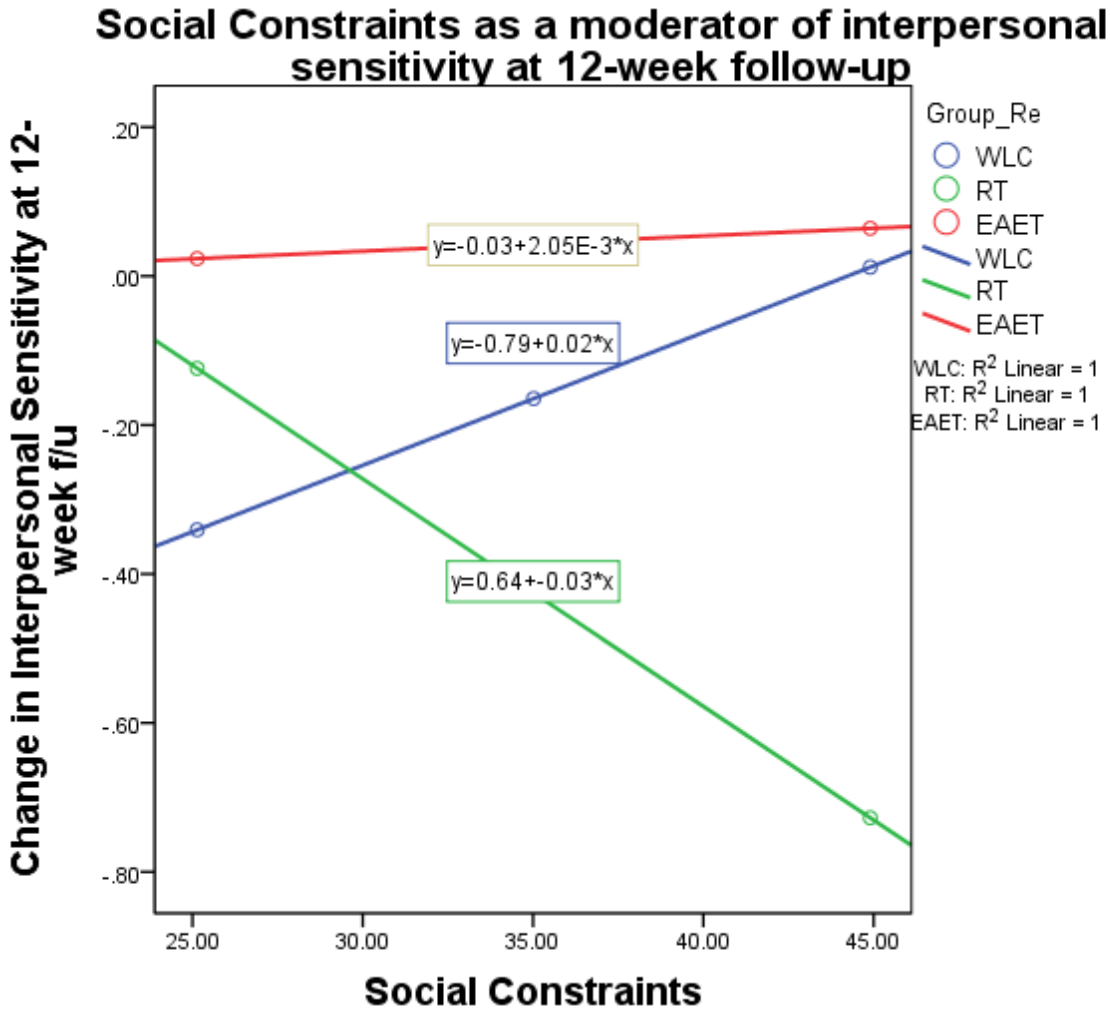

Figure 10. Social constraints as a moderator of interpersonal sensitivity at 12-week follow-up.

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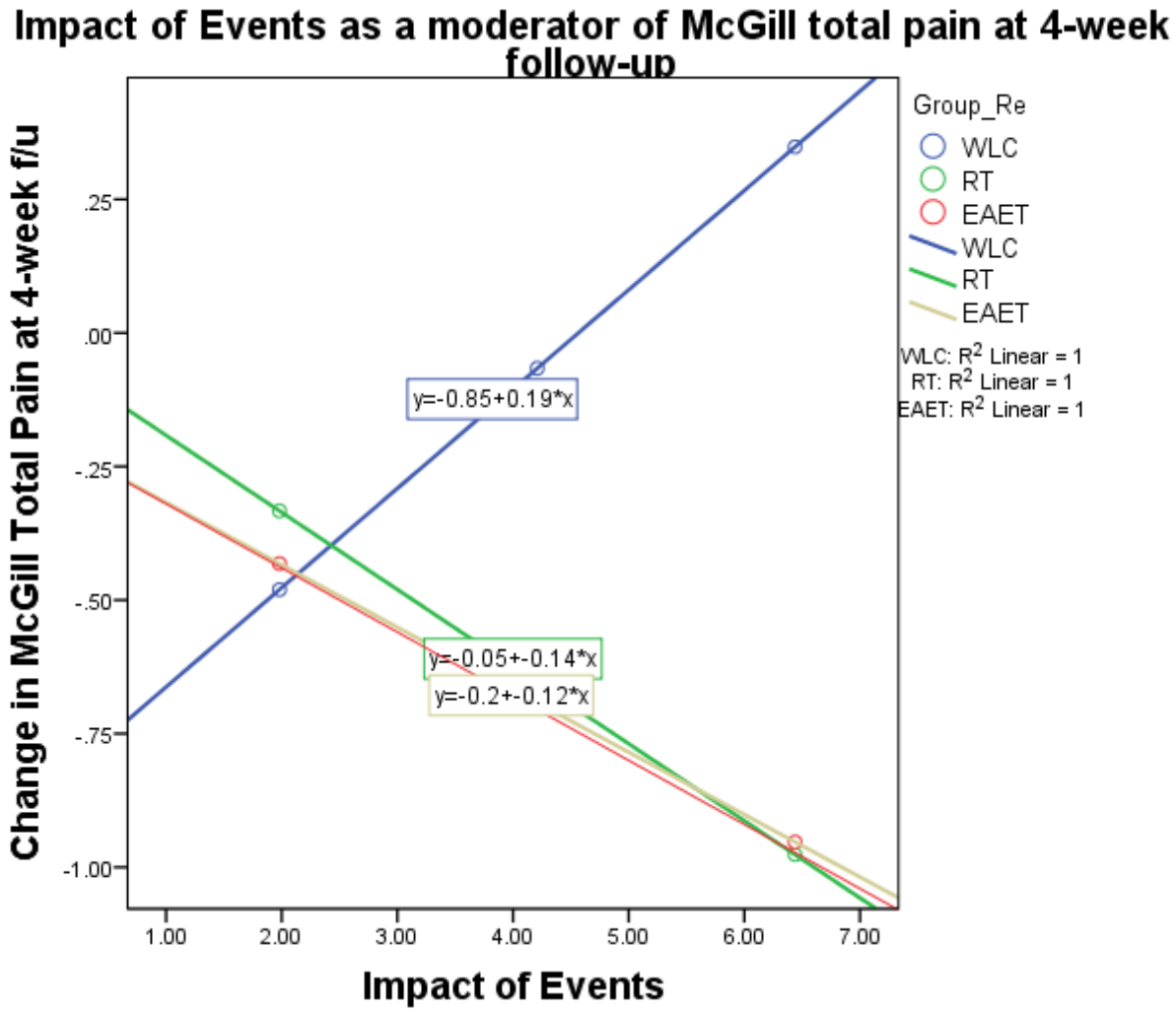

Figure 11. Impact of events as a moderator of McGill total pain at 4-week follow-up.

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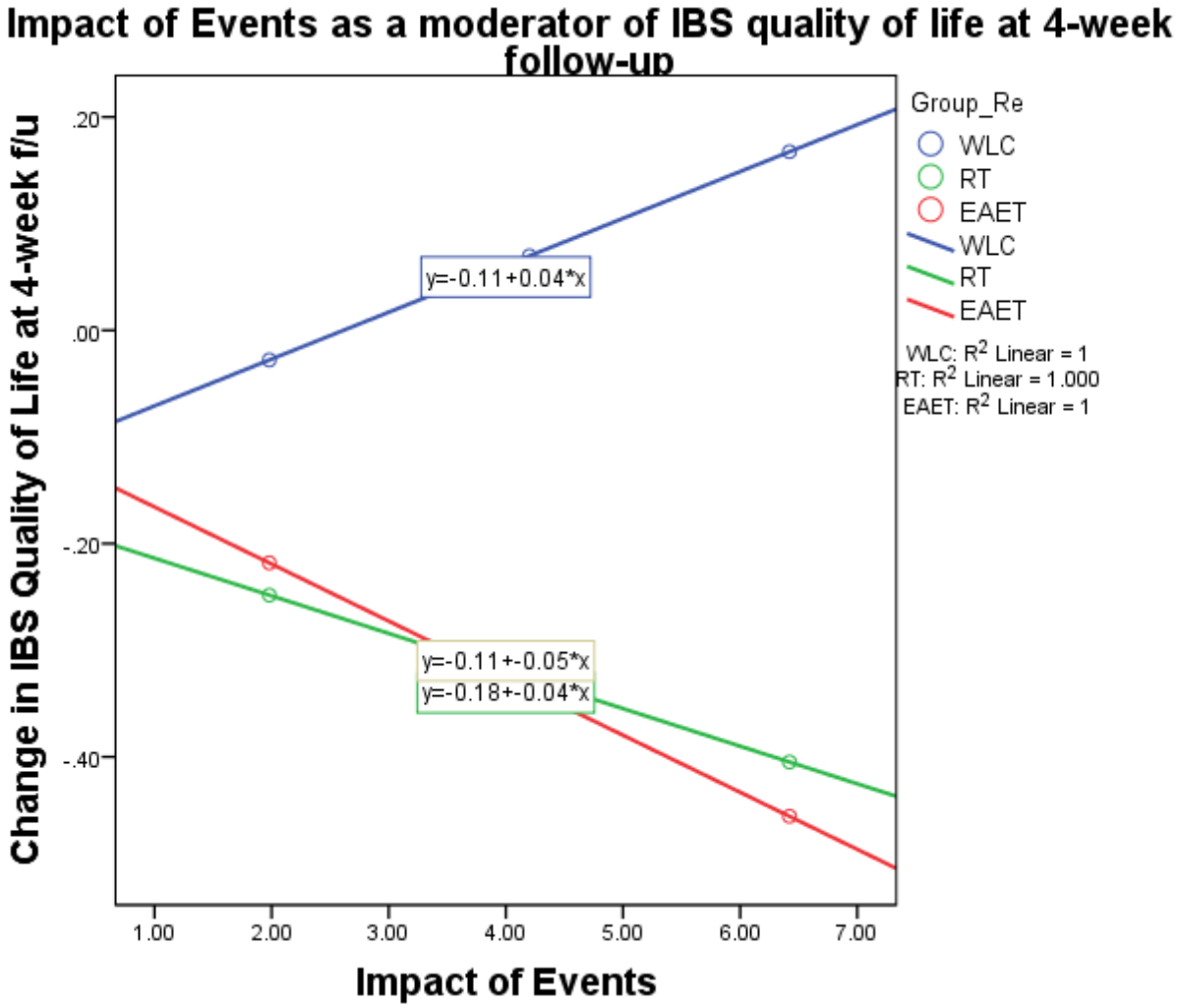

Figure 12. Impact of events as a moderator of IBS quality of life at 4-week follow-up.

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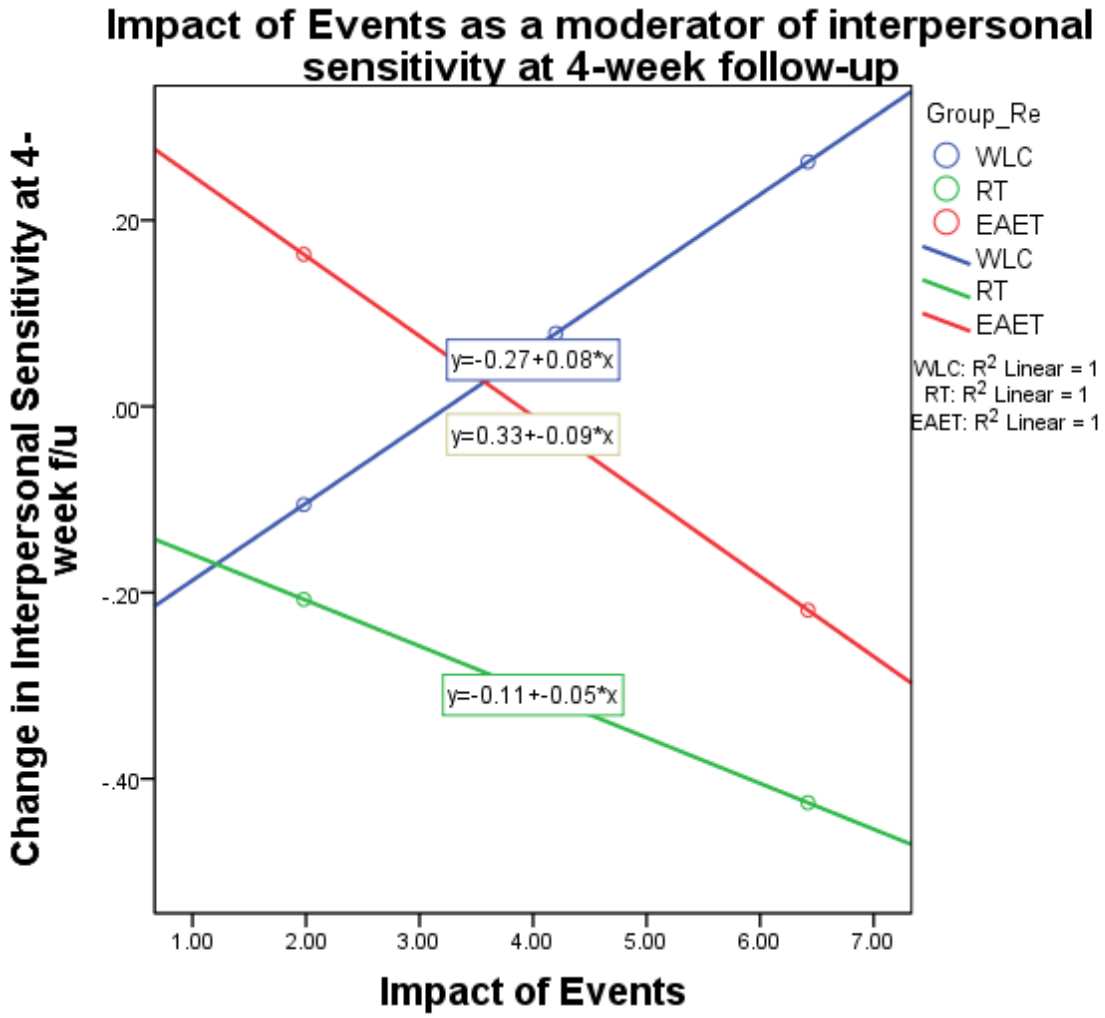

Figure 13. Impact of events as a moderator of interpersonal sensitivity at 4-week follow-up.

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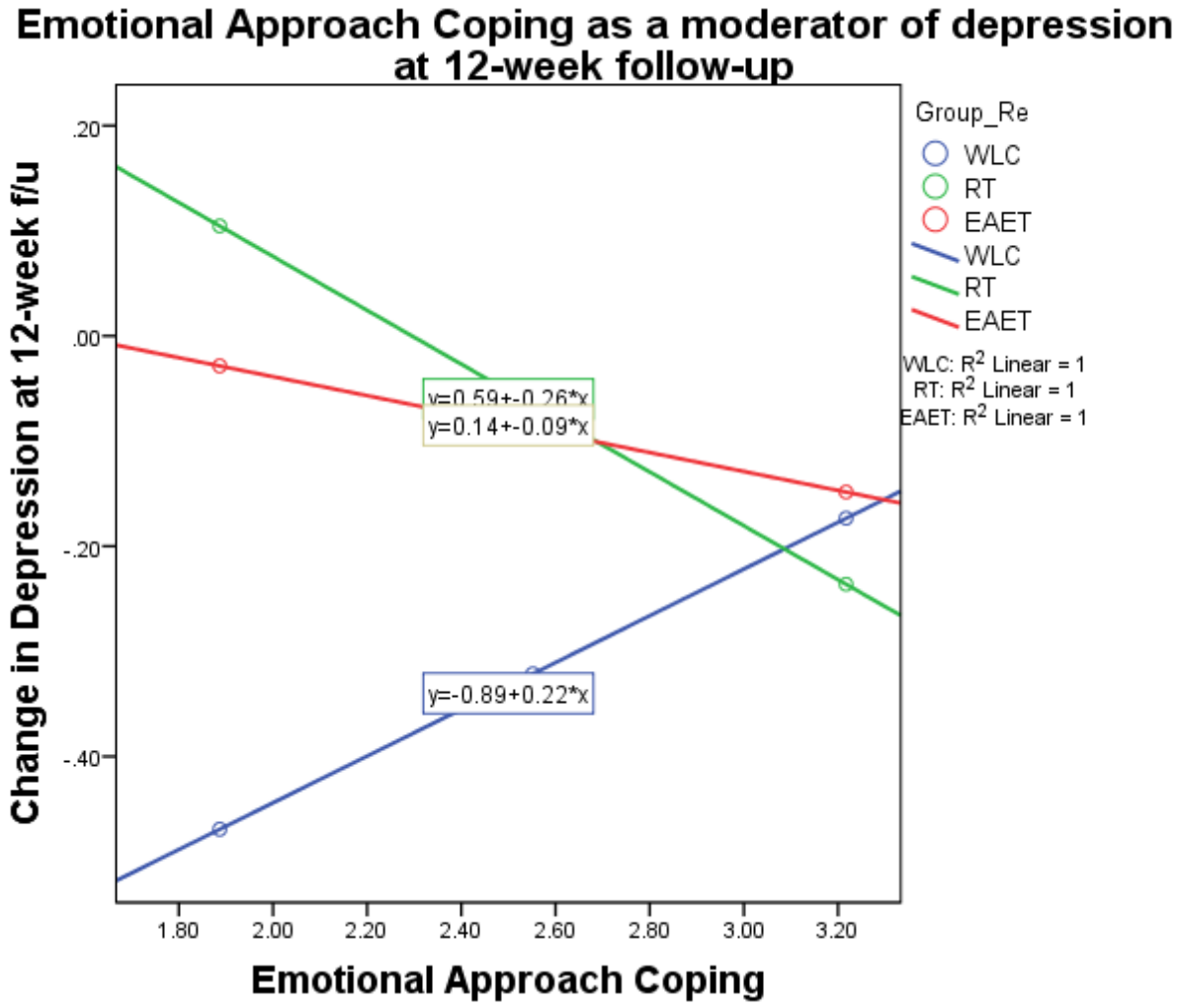

Figure 14. Emotional approach coping as a moderator of depression at 12-week follow-up.

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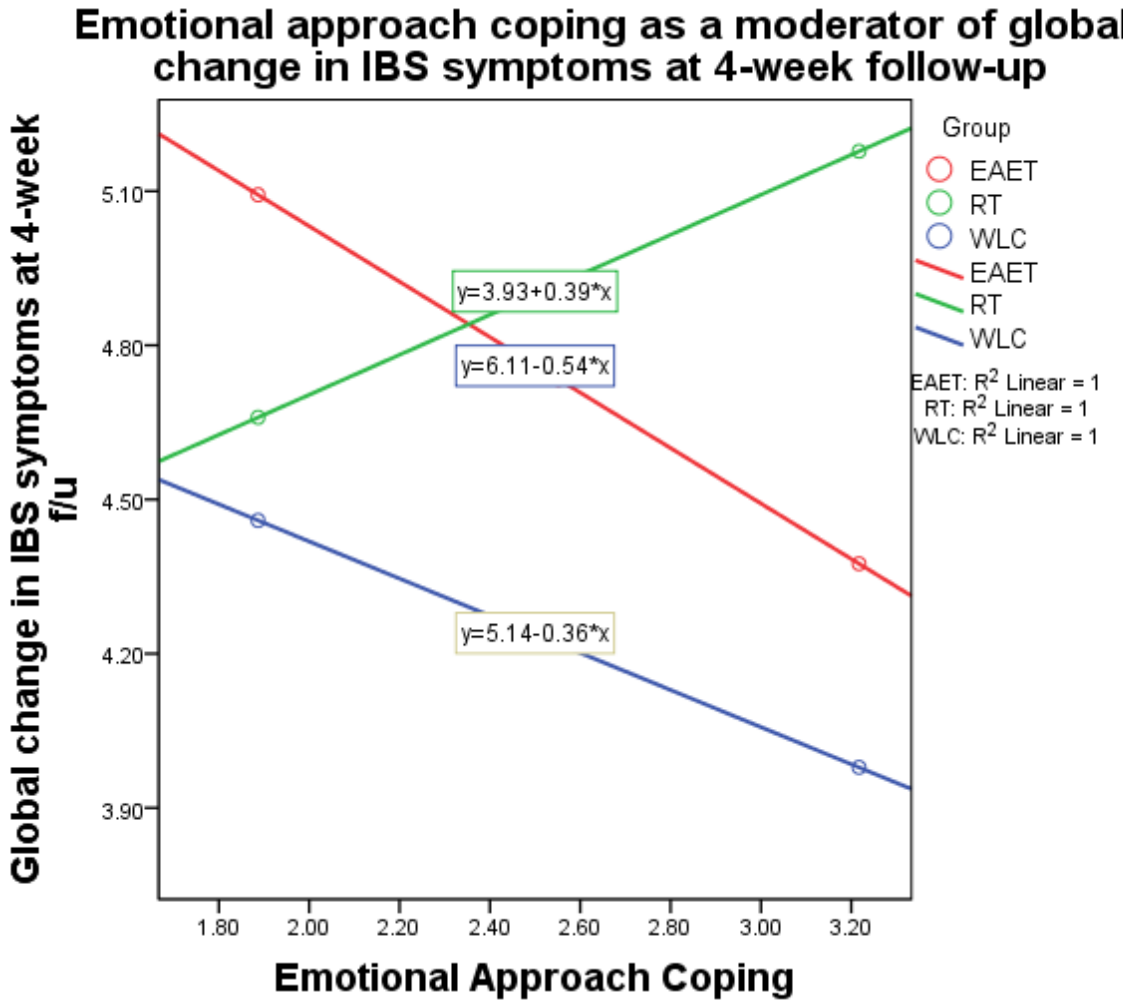

Figure 15. Emotional approach coping as a moderator of global change in IBS symptoms at 4-week follow-up.

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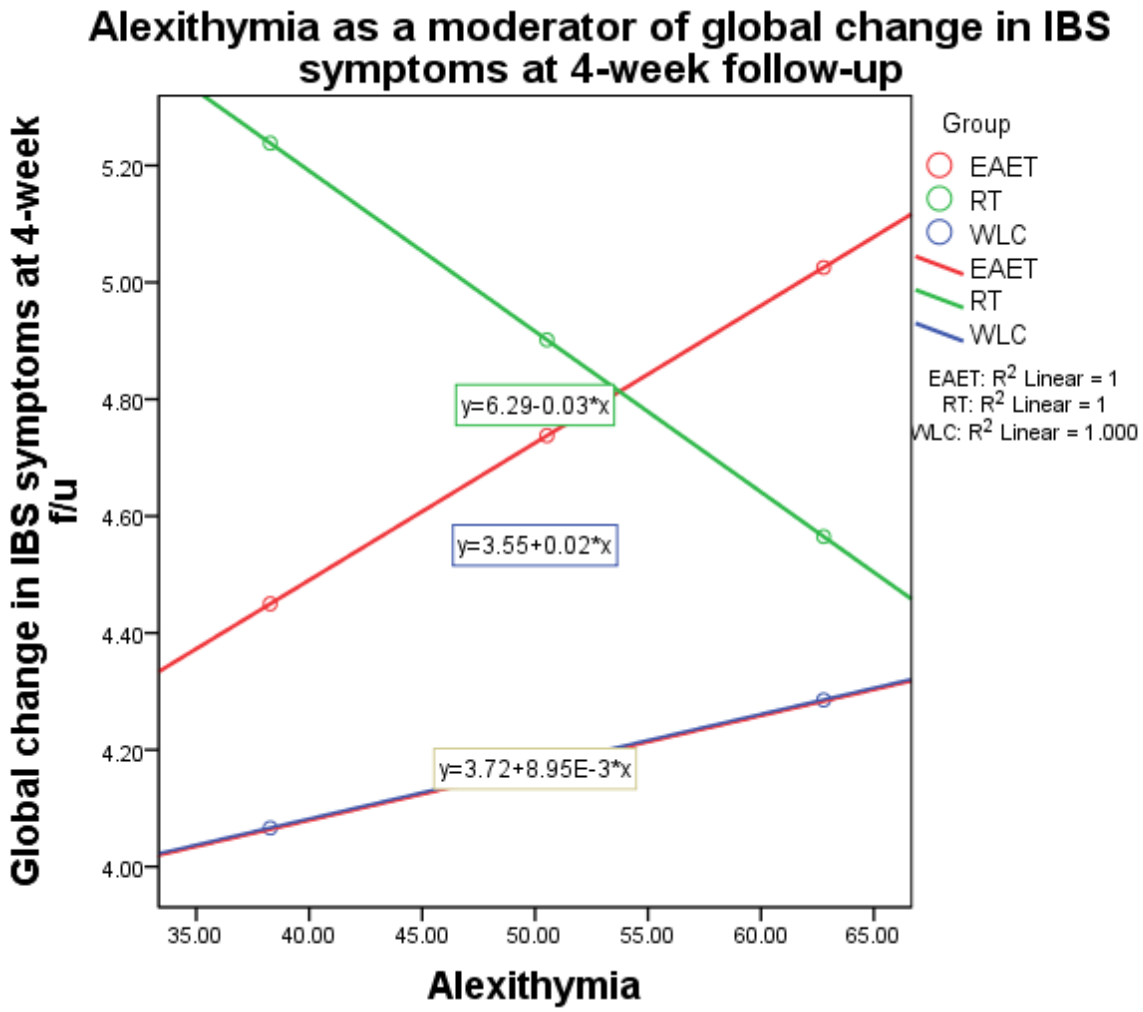

Figure 16. Alexithymia as a moderator of global change in IBS symptoms at 4-week follow-up.

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ABSTRACT

AMBIVALENCE OVER EMOTIONAL EXPRESSION, SOCIAL CONSTRAINTS, AND TRAUMA AS MODERATORS OF EMOTIONAL AWARENESS AND EXPRESSION TRAINING AND RELAXATION TRAINING FOR INDIVIDUALS WITH IRRITABLE BOWEL SYNDROME

by

HANNAH HOLMES

August 2016

Advisor: Dr. Mark Lumley

Major: Psychology (Clinical)

Degree: Master of Arts

Irritable bowel syndrome (IBS) is a central sensitization gastrointestinal disorder that affects 10-15% of the population. Psychosocial factors, including stress, social support, emotional processes, and trauma, have been shown to play a role in the development of IBS and the severity of symptoms. Effect sizes for psychological treatments are modest, indicating individual differences in effectiveness. A subset of patients with IBS may benefit from Emotional Awareness and Expression Training (EAET), a novel intervention that encourages the awareness and expression of emotions. In this study, 106 participants with IBS were randomized into one of two interventions—Relaxation Training or EAET—or a Waitlist Control group. Participants completed measures of IBS symptom severity and quality of life, emotional processes, and trauma. Moderator analyses were used to test whether individuals with more ambivalence over emotional expression, greater perceived social constraints, and more traumatic experiences are more likely to benefit from EAET than those with lower scores on these constructs. Results indicated that overall, the hypothesized and exploratory moderators moderate the effects of treatment group on health outcomes for RT compared to WLC, but not EAET compared to RT or WLC as

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hypothesized. Specifically, although both interventions (EAET and RT) appeared to result in improved health outcomes at 1- and 12-week follow-up (Thakur et al., 2016), it seems that RT was especially helpful for certain individuals, which may indicate that EAET is more helpful to a greater number of patients with IBS while RT is differentially helpful for certain groups.

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AUTOBRIOGRAPHICAL STATEMENT

Hannah Holmes is a clinical psychology doctoral student at Wayne State University. She completed her undergraduate degree in psychology from Cedarville University in 2013. Hannah's career interests are in the area of health psychology, specifically women's health and sexuality, and how these domains relate to trauma and emotional awareness and expression. She has been involved with several research projects in the Stress and Health Lab that investigate emotion-focused interventions for individuals with a variety of chronic pain conditions including irritable bowel syndrome and chronic pelvic pain. Hannah is currently a research assistant on a study examining the efficacy of an emotional awareness and expression intervention for individuals with comorbid chronic pain and substance use at the Tolan Park Research Clinic. She is also currently conducting a research project that will evaluate the mental and physical health changes in response to participation in the Rape Aggression Defense (RAD) course, a self-defense course for women.

Hannah has gained additional research experience at the Women's Urology Center at Beaumont Health System as a research assistant since 2014, and has been involved in delivering integrated care behavioral health services to patients at the Troy Beaumont Family Medicine Center for the past year and a half. These experiences have further developed her goals of becoming a clinical research scientist in an academic health center. Hannah has also worked at Wayne State University teaching several courses to undergraduate students, including Introduction to Psychology Lab and Statistics Lab.

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