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Ambivalence over Emotional Expression and Perceived Social Constraints as Moderators of Relaxation Training and Emotional Awareness and Expression Training for Irritable Bowel Syndrome

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Abstract

Objective—Psychological treatments are generally beneficial for patients with irritable bowel syndrome (IBS), but patients' responses vary. A prior randomized controlled trial found that both relaxation training (RT) and emotional awareness and expression training (EAET) were superior to a waitlist control condition for IBS symptoms, quality of life, depression, and anxiety among IBS patients [1].

Method—We conducted secondary analyses on these data to examine potential moderators of treatment outcomes. Baseline measures of patients' ambivalence over emotional expression and perceived social constraints, which have been hypothesized to influence some treatments, were tested as possible moderators of the effects of RT and EAET, compared to the control condition.

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Results—Results indicated that these variables moderated the effects of RT but not EAET. The benefits of RT occurred for patients who reported higher ambivalence over emotional expression or perceived social constraints, whereas the benefits of EAET were not influenced by these factors.

Conclusion—These findings suggest that RT might be particularly helpful for people who tend to avoid emotional disclosure and expression, supporting the possible benefit of targeting treatments to patient characteristics and preferences, whereas EAET might be helpful for a broader range of patients with IBS.

Keywords

irritable bowel syndrome; psychological interventions; relaxation training; emotional awareness and expression training

1. Introduction

Irritable bowel syndrome (IBS) is a disorder of bidirectional brain-gut interactions and is characterized by a) abdominal pain that improves with defecation, and b) is associated with changes in stool frequency or form [2]. IBS occurs in 10–15% of the population [3], and can be debilitating, greatly affecting a person's functioning, quality of life, and psychological status [4, 5]. Stress, exposure to traumatic events, emotional avoidance or suppression, and physiological arousal are common in IBS and appear to trigger or augment symptoms [6–8].

Various psychological and behavioral treatments for IBS have been tested [9, 10]. Relaxation training (RT)—including progressive muscle relaxation, relaxed breathing, and guided imagery—directly reduces the physiological arousal and negative emotions that contribute to IBS symptoms. RT is the most common component of cognitive-behavioral or stress management interventions for IBS, but RT also improves self-reported gastrointestinal symptoms in patients with IBS as a stand-alone intervention [11, 12]. A conceptually different approach to stress reduction targets IBS symptoms by reversing emotional avoidance or suppression. Emotional awareness and expression therapy (EAET) integrates concepts and techniques from experiential, intensive psychodynamic, prolonged exposure, expressive writing, and rescripting therapies to help patients resolve emotional conflicts. Stressors are disclosed and primary emotions are expressed in session by engaging in role-playing and empty chair techniques while activating one's body and voice to directly express feelings (e.g., anger, guilt, love). This therapy has been shown to reduce self-reported pain severity and psychological symptoms in patients with fibromyalgia [13], chronic musculoskeletal pain [14], and medically unexplained symptoms [15].

In a recent randomized trial, we tested the effects of brief (3-session) RT and EAET against a waitlist control (WLC) condition among patients with IBS [1]. Compared with the control condition, both RT and EAET improved quality of life, EAET significantly lowered IBS symptoms and anxiety, and RT significantly reduced anxiety and depression. Effect sizes compared to control ranged from small to large (Cohen's *d* ranging from 0.21 to 0.86); about two-thirds of the EAET patients and over half of RT patients showed clinically significant reductions in IBS symptoms. These data suggest that both interventions are generally effective, but outcomes vary among patients.

No studies have examined patient characteristics that moderate – that is, differentially predict – the outcomes of treatments versus control conditions for IBS. Only demographic and baseline symptom predictors of success within a single treatment have been examined [16], which highlights the need for studies of moderators. Lumley [17] developed a theoretical model of who benefits from emotional disclosure, which serves as a framework from which to consider potential moderators of emotional awareness and expression interventions. According to this model, individuals are more likely to benefit from emotional disclosure under certain conditions, including when they tend to inhibit disclosure of stressors and emotions, or they perceive that their social environment discourages disclosure. In this study, we extend this model to RT in addition to EAET.

We conducted secondary analyses of the data from the randomized trial of RT, EAET, and control [1]. We examined two baseline patient characteristics from Lumley [17] emotional disclosure model that we thought might moderate the effects of each treatment compared to waitlist controls. First, ambivalence over emotional expression refers to ambivalence or conflicted feelings about expressing one's emotions – that is, the simultaneous desire to express one's feelings but also fear of doing so. Second, the construct of perceived social constraints refers to the experience of being “compelled by others to regulate, restrict, or modify our thoughts, actions, or feelings” [18]. Perceived social constraints refers to the perception that one must restrict one's thoughts and feelings because of others; thus, it is influenced by both external factors (e.g., family, friends), and internal factors (e.g., sensitivity to interpersonal cues, discomfort with disclosure).

There are several possible ways that patients' ambivalence over emotional expression and perceived external constraints against disclosure or expression of private thoughts and feelings may influence patients' responses to RT and EAET. First, both of these individual differences variables are likely to create stress in patients, and both RT and EAET aim to reduce stress – RT via autonomic down-regulation of the stress response, and EAET by activation and expression of emotions related to stress. Thus, given that both RT and EAET target stress reduction, it is possible that elevated baseline levels of both ambivalence over emotional expression and perceived social constraints would predict more improvement in response to both RT and EAET. Second, both ambivalence over emotional expression and perceived social constraints may reflect a preference for not disclosing stressors and expressing emotions. In that case, such patients may have positive outcomes of a therapy that matches their preference—RT—because it does not entail disclosure and emotional expression, but such patients would have poorer outcomes of a therapy that does have such expectations—EAET. Finally, as suggested by studies of private expressive writing about stress [19–21], it is possible that socially constrained patients would have better outcomes of EAET, given that both EAET and expressive emphasize the importance of disclosure and expression of inhibited, stress-related emotions. We tested these various hypotheses by examining ambivalence over emotional expression and perceived social constraints as potential moderators of RT and EAET compared to waitlist controls.

2. Method

2.1. Participants

Participants were adults recruited from the local community through newspaper and internet advertisements and the distribution of fliers in waiting rooms at gastroenterology clinics. All participants had to meet the Rome III Diagnostic Criteria for Functional Gastrointestinal Disorders, specifically for IBS [22] and report pain or discomfort at least two days per week. Exclusion criteria included post-infectious IBS, organic gastrointestinal diseases (e.g., inflammatory bowel disease), immunodeficiency, a current psychotic disorder or bipolar disorder, drug or alcohol dependence within the past two years, inability to communicate in English, or participation in another clinical research trial for IBS.

2.2. Procedures

This study was approved by the local IRB and registered before recruitment at clinicaltrials.gov (NCT01886027). Study activities were conducted at a university department of psychology. Eligible participants provided written informed consent and completed baseline questionnaires, including potential moderator measures and baseline levels of trial outcome measures. Participants were randomized to one of the three conditions; randomization was stratified by participant gender and therapist and conducted in randomized blocks of 3 and 6. Participants assigned to either RT or EAET had their first session immediately following their baseline assessment, and returned 1 and 2 weeks later for sessions 2 and 3. All participants completed follow-up outcome measures again 2 weeks and 10 weeks after session 3 (or the equivalent time for waitlist controls). Participants were paid for completing assessments, and interventions were provided at no charge.

All three sessions of both RT and EAET were conducted individually for 50 minutes, once per week, by female, master's-level therapists. At the end of each session, homework was provided, and supervision was conducted to assure treatment competence and fidelity. All participants were encouraged to maintain their usual IBS-related healthcare throughout the trial.

2.3. Relaxation Training (RT)

This intervention is based on the premise that long-term stress elevates physiological arousal, exacerbates pain, and dysregulates the brain-gut relationship in IBS. The goal of RT is to reduce physiological arousal and negative mood, thereby attenuating IBS symptoms. Participants were taught different relaxation training skills (e.g., progressive muscle relaxation, applied relaxation, and guided imagery) over the three manualized sessions, based on Blanchard et al. [11]. During each session, participants were guided through the relaxation exercise, and they learned variations of the techniques (e.g., applied relaxation), so they could integrate them into their everyday lives. Homework consisted of practicing the exercises with audio recordings for guidance.

2.4. Emotional Awareness and Expression Training (EAET)

This intervention is based on the principle that stress and conflict are maintained by emotional suppression or avoidance, which can lead to chronic over-arousal, somatic

symptoms, and a dysregulated brain-gut system. The goal of the intervention is to help patients resolve stress by: a) educating them about connections among their stressful life experiences, emotions, and somatic symptoms; b) teaching them to identify, experience, and express their emotions related to these stressful situations; and c) encouraging them to engage in direct, adaptive interpersonal behaviors in their daily lives, including assertive and genuine communication with others (see also [13–15, 23]). Over the course of three manualized 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, therapists used role plays to help patients communicate more accurately and directly in their key relationships. Homework between each session consisted of expressive writing about key conflictual relationships and monitoring relationships and avoided communication in daily life.

2.5. Waitlist Control (WLC)

These patients engaged only in their usual care during the trial.

2.6. Potential Moderator Measures

2.6.1. Ambivalence over Emotional Expressiveness Questionnaire (AEQ)—On the 14-item version of the AEQ [24], participants rated items that indicate ambivalence or conflict over the external expression of one's feelings (e.g., "Often I'd like to show others how I feel, but something seems to hold me back"). Items were rated from 1 (*I have never felt like this*) to 5 (*I feel like this a lot*) and averaged; higher scores indicate greater ambivalence over emotional expression. The AEQ has demonstrated high reliability and correlates negatively, as expected, with psychological well-being and life satisfaction [24]. In our sample, the scale had high internal consistency ($\alpha = .88$).

2.6.2. General Social Constraints Scale (GSC)—On the 15-item GSC [25], participants rated how often friends or family members respond to them in ways that suggest that 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?"). Items were rated from 1 (*never*) to 4 (*often*) and summed; higher scores indicate more perceived social constraints. The GSC-15 has been shown to have excellent internal consistency among some medical populations, and correlates with higher levels of distress as well as both patients' and spouses' ratings of spouses' constraining behaviors [18]. This scale had high internal consistency in our sample ($\alpha = .91$).

2.7. Outcome Measures

2.7.1. IBS Symptom Severity Scale (IBS-SSS)—The five items, rated on a 0–100 scale, 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. Ratings were summed; higher scores indicate greater IBS symptom severity. The IBS-SSS has been shown to demonstrate reproducibility and sensitivity to change [26].

In our sample, the IBS-SSS had questionable reliability at baseline ($\alpha = .58$) and acceptable to good internal consistencies at the 2-week and 10-week assessments ($\alpha = .70$ and $.83$).

2.7.2. Irritable Bowel Syndrome-Quality of Life (IBS – QOL)—The IBS-QOL assesses how IBS impacts participants' mood, activities, body image, health worry, social reaction, sexuality, and relationships generally (i.e., no specific time frame). The 34-item scale demonstrates high internal reliability among patients with IBS, and its validity is demonstrated by correlations with IBS symptoms and lower psychological well-being [27]. Items were rated from 1 (*not at all*) to 5 (*a great deal*) and summed; higher scores indicate *poorer* quality of life. In our sample, this scale had very high reliability at the three assessment points ($\alpha = .95$, $.95$, and $.96$).

2.7.3. Brief Symptom Inventory—The BSI is a widely-used, reliable, and validated measure of psychological or psychiatric symptoms among a variety of patient populations [28, 29]. Participants rated symptoms over the past week from 0 (*not at all*) to 4 (*extremely*); ratings were averaged. We analyzed the 6-item depression ($\alpha = .84$, $.87$, and $.89$) and 6-item anxiety ($\alpha = .78$, $.85$, and $.88$) subscales. (The hostility scale also was analyzed in the parent trial, but it showed no significant treatment effects and was not analyzed here.)

2.8. Statistical Analyses

SPSS was used to compute descriptive statistics and bivariate correlations. Missing outcome values were replaced with the patient's last value carried forward. Change scores from baseline to each follow-up timepoint were calculated; baseline values of each outcome measure were subtracted from values at 2-week and 10-week follow-ups. These changes in health outcome variables served as the dependent variables in the current analyses. The PROCESS macro [30] was used to conduct tests of moderation. PROCESS Model 1 tested interactions between a moderator and treatment condition on changes in outcome measures. Sixteen parallel sets of analyses were run, wherein RT was compared with WLC, and then EAET was compared with WLC, for each of the two potential moderators (ambivalence over emotional expression and perceived social constraints) on each treatment outcome change score, at each follow-up time point. No covariates were included in these analyses. To test for the significance of effects, we obtained 95% bias-corrected bootstrapped confidence intervals based on 1,000 bootstrapped samples. Significant interactions were then probed by plotting values of 1.0 SD above and below the mean of the moderator.

3. Results

We randomized a sample of 106 patients with IBS; patients were mostly female (80%) and European American (65%) or African American (23%), with a mean age of 36 years. Note that Thakur et al. (2017) presents complete sociodemographic, medical history, baseline and follow-up data for outcome measures, for the full sample and each treatment condition separately. Of the 106 participants, 36 were randomized to RT, 37 to EAET, and 33 to WLC.

As expected, the baseline measure of ambivalence over emotional expression (sample $M = 3.08$, $SD = 0.81$, range = 1.1–4.4) was positively correlated ($r = .41$, $p < .001$) with baseline perceived social constraints (sample $M = 35.02$, $SD = 9.88$, range = 18–55); however, the

16.8% shared variance suggests that there is enough independence of these two measures to merit independent analyses.

Table 1 presents the results of the main statistical analyses, showing how each of the two potential moderators is correlated with change in IBS symptom severity, quality of life, depression, and anxiety, for RT, EAET, and controls. Note that for all outcome variables, lower values of the change score indicate more improvement over time. Thus, a negative correlation in the table, for example, means that higher scores on the baseline moderator predict more improvement (lower scores) on the outcome measure.

3.1. Moderators of the Effects of Relaxation Training Versus Control

Both ambivalence over emotional expression and perceived social constraints predicted change after RT, and in some cases, moderated the effects of RT versus control.

3.1.2. Ambivalence over emotional expression—Baseline ambivalence over emotional expression had uniformly negative correlations (i.e., predicted improvement) with all outcomes at both time points after RT. Three of these correlations reached significance: greater ambivalence over emotional expression predicted improvement in 2-week quality of life ($r = -.36$, $p = .030$) and both 2-week and 10-week depressive symptoms ($r = -.35$, $p = .037$, and $r = -.43$, $p = .009$, respectively). Tests of moderation indicated that the prediction of change in depressive symptoms at 2-week follow-up was significantly different in RT than the near-zero relationship found in controls, $b = -.34$, $t(100) = -2.01$, 95% CI $[-.683, -.004]$, $p = .047$. Figure 1 presents this interaction, showing that the improvements in depression after RT compared to control are seen only at high levels of ambivalence over emotional expression, but RT did not differ from control at low levels of ambivalence. Note that the pattern of correlations at the 10-week follow-up was similar, but the interaction fell to non-significant, $b = -.32$, $t(100) = -1.89$, 95% CI $[-.653, .017]$, $p = .062$.

3.1.2. Perceived social constraints—All but one of the correlations between baseline perceived social constraints and outcome change scores were negative in the RT condition, and several were significant, indicating that greater baseline perceived social constraints predicted greater improvement after RT. There were three significant moderator effects. Perceived social constraints moderated the effects of RT compared to controls on IBS symptom severity at 2-week follow-up, $b = -.14$, $t(100) = -3.07$, 95% CI $[-.235, -.050]$, $p = .003$. As shown in Figure 2, higher perceived social constraints predicted more improvement in IBS symptoms after RT ($r = -.36$, $p = .032$), but significantly predicted the opposite following control ($r = .36$, $p = .039$). This moderating effect fell to non-significant at the 10-week follow-up, $b = -.10$, $t(100) = -1.81$, 95% CI $[-.212, -.010]$, $p = .072$.

Perceived social constraints also moderated the effects of RT on IBS-related quality of life at 2-week follow-up, $b = -.03$, $t(100) = -2.50$, 95% CI $[-.054, -.006]$, $p = .014$; greater perceived social constraints predicted improved IBS-related quality of life after RT ($r = -.37$, $p = .027$) compared to WLC ($r = .28$). Finally, perceived social constraints moderated the effects of RT on depressive symptoms at 10-week follow-up, $b = -.04$, $t(100) = -2.05$, 95% CI $[-.069, -.001]$, $p = .042$. Greater perceived social constraints predicted improved depressive symptoms after RT ($r = -.31$, $p = .070$), but not after control ($r = .14$). For all of

these moderator effects, the benefits of RT over control were seen only at high levels of perceived social constraints, but at low levels of social constraints, RT was similar in outcomes to waitlist control.

3.2. Moderators of the Effects of Emotional Awareness and Expression Training Versus Control

In contrast to the pattern of relationships with RT, neither ambivalence over emotional expression nor perceived social constraints predicted outcomes after EAET. Correlations were often near zero, and none were significant. Moreover, neither of the two baseline patient characteristics significantly moderated the effect of EAET versus control on any of the outcomes.

4. Discussion

Although both RT and EAET are efficacious interventions for IBS, only some people respond positively to each one. To better understand who benefits from these interventions, this study analyzed data from a prior randomized clinical trial and examined two individual difference variables as potential treatment moderators. Ambivalence over emotional expression and perceived social constraints were studied to determine whether they moderate the effects of both RT and EAET on IBS-related outcomes, compared to a waitlist control condition. Findings indicate that both ambivalence over emotional expression and perceived social constraints predicted the effects of RT compared to controls, but not of EAET. That is, although both interventions in the original trial were beneficial on average [1], RT was beneficial only for those patients with elevated baseline ambivalence over emotional expression or perceived social constraints. In contrast, neither of these two patient variables predicted outcomes in EAET, suggesting that this intervention is more broadly beneficial.

This pattern of results supports the hypothesis that RT may be particularly well-suited to patients who tend to avoid disclosure and emotional expression. Those patients who are more ambivalent about expressing their emotions, or who perceive more constraints to disclosure in their social environment, may prefer an intervention such as RT, which does not ask the patient to engage in emotional expression or disclosure. Note that the positive relationship ($r = .41$) between an “intrapsychic” variable—ambivalence over emotional expression—and a seemingly “external” variable—social constraints—suggests that both constructs tap into a larger sense of discomfort with, or perceived barriers to, disclosure and expression. Patients who report ambivalence over emotional expression or perceive social constraints against disclosure and expression may prefer the emotionally and interpersonally “safe” or non-arousing skills and techniques taught in RT. Indeed, the psychotherapy literature strongly supports the benefits of matching treatment type to patient preference [31, 32]. Note, however, that the benefits of EAET across all levels of ambivalence over emotional expression and social constraints indicates that a preference for a treatment other than EAET, does not necessarily mean EAET would not be beneficial. Interestingly, patients who were low on ambivalence over emotional expression and perceived social constraints did not benefit at all from RT. One possibility is that such patients have relatively little stress

to reduce, so that RT was not able to be effective, but it also is possible that such patients would prefer an intervention that involves emotional activation and expression.

We note, however, that patients' preferences for an intervention such as RT, which does not activate negative emotions, may not be in their long-term best interest. Exposure-based therapies tend to be effective for people who avoid their experiences, if such patients will engage in the therapy. We tested the one hypothesis that patients with elevated ambivalence over emotional expression or perceived social constraints would respond better to EAET because it targets suppressed or constrained emotional expression. An alternative hypothesis is that such patients would have a negative response to EAET, given that it challenges their fears, and avoidant patients might refrain from engaging in EAET. Neither of these hypotheses were supported; rather, the benefits of EAET were independent of these patient characteristics, suggesting that EAET is generally beneficial. It is also possible that both facilitating and hindering processes were operating in different EAET patients, thereby negating the effects of these patient characteristics.

We acknowledge several limitations of the study. Neither the AEQ or GSC have been validated in patients with IBS, so continued study in this population is needed. To fully share our analyses, we reported all analyses on all outcomes and time points. Yet conducting multiple analyses increased the risk of Type 1 errors, and a more conservative approach, such as general linear modeling across all time points, might have been optimal. Sample sizes for each of the three conditions were relatively small, reducing the statistical power of analyses; however, there was enough power to reveal moderation of RT, which suggests that the lack of moderation in EAET is not a sample size issue. It is possible that a broader CBT protocol, which includes a range of components, such as exposure therapy to bowel sensations and behavioral activation, in addition to RT, would not be moderated by these patient variables, or that a longer EAET protocol that allows for a therapeutic alliance to develop and patients to fully engage in emotional work, would show moderation effects. Furthermore, moderation effects might have been different at a later timepoint. These results may not generalize to patients with other somatic or pain disorders, although IBS is part of the central sensitization spectrum of disorders [33]. Finally, we studied only two of many patient variables that might moderate the effects of these interventions. Future research should continue to explore how best to match treatments to IBS patients. Research is needed, for example, on factors such as readiness to change [34], trauma history [35], and patient preferences [32]. Research should explore predictors and moderators of EAET and RT in usual care settings, such as primary care or gastroenterology settings.

In conclusion, although both RT and EAET improved health outcomes in IBS [1], the effects of RT were moderated by certain patient characteristics at some timepoints. RT was particularly helpful for individuals high in ambivalence over emotional expression and perceived social constraints. EAET, in contrast, was not moderated by these characteristics, but was generally beneficial for patients. We think that the moderators tested in this study—ambivalence over emotional expression and perceived social constraints—reflect a lack of readiness for emotional work, or a preference for non-emotion-focused therapy. Patients with these characteristics will do well with RT, but patients low on these characteristics may not, and EAET might be more appropriate them. More generally, this study suggests that

patient characteristics matter in treatment selection for IBS—and probably many other disorders—and research should continue to examine these factors so that appropriate treatment targeting can be accomplished.

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Figure 1.

Ambivalence over emotional expression moderates the effects of relaxation training versus controls on change in depressive symptoms at 2-week follow-up

Figure 2. Perceived social constraints moderates the effects of relaxation training versus controls on IBS symptom severity at 2-week follow-up.

Table 1

	RT <i>n</i> = 36	EAET <i>n</i> = 37	WLC <i>n</i> = 33	Significant condition differences
Ambivalence over emotional expression				
<u>Symptom severity</u>				
2-week	-.20	-.18	-.01	
10-week	-.22	-.14	-.05	
<u>Quality of life</u>				
2-week	-.36 [*]	-.12	-.21	
10-week	-.11	-.06	-.26	
<u>Depressive symptoms</u>				
2-week	-.35 [*]	-.12	.08	RT v. WLC
10-week	-.43 ^{**}	-.06	-.07	
<u>Anxiety symptoms</u>				
2-week	-.17	-.14	-.23	
10-week	-.33	.04	-.30	
Social constraints				
<u>Symptom severity</u>				
2-week	-.36 [*]	-.01	.36 [*]	RT v. WLC
10-week	-.26	.05	.19	
<u>Quality of life</u>				
2-week	-.37 [*]	-.22	.28	RT v. WLC
10-week	-.30	-.22	.08	
<u>Depressive symptoms</u>				
2-week	-.23	-.06	.07	
10-week	-.31	-.05	.14	RT v. WLC
<u>Anxiety symptoms</u>				
2-week	.16	-.21	-.18	
10-week	-.12	-.04	.16	

*
 $p < .05$;

**
 $p < .01$;

 $p < .001$

Correlations of baseline ambivalence over emotional expression and perceived social constraints with changes in outcome measures for each of the three conditions

RT = Relaxation training; EAET = Emotional awareness and expression training, WLC = Waitlist control. Change scores (follow-up minus baseline) are correlated with each potential moderator variable; lower values of all change scores indicate more improvement