

Cognitive Behavioral Therapy for IBS: How Useful, How Often, and How Does It Work?

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Abstract

Purpose of Review While dietary and medical treatments are beneficial for specific GI symptoms for some IBS patients, they have an unsatisfactory track record for the full range of GI symptoms for more severe patients. A number of psychological interventions have been developed over the past two decades to help patients' self-manage symptoms. This review discusses the last 5 years of research on psychological treatments, with a focus on cognitive behavioral therapy (CBT) and hypnosis.

Recent Findings Recent systematic reviews indicate that psychological interventions are efficacious and their gains are maintained long-term. Treatment gains are not a function of the number of sessions.

Summary Psychological interventions are at least moderately efficacious treatments for IBS symptoms. Of different psychotherapies, CBT and hypnosis appear efficacious in minimal-contact formats (e.g., fewer sessions, phone contact). Research is still needed to identify theoretically relevant active ingredients that underlie treatment effects.

Keywords Irritable bowel syndrome · Functional GI disorders · Outcome research · Psychological treatments · Mechanisms of change · Hypnosis · Cognitive behavioral therapy

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Introduction

Irritable bowel syndrome (IBS) is a common, oftentimes disabling, functional gastrointestinal disorder whose full range of symptoms are generally unresponsive to conventional medical therapies. For this reason, a number of psychological therapies have been developed and validated over the past 20 years. Their theoretical roots are grounded in a biopsychosocial model which holds that a person's biology (e.g., genetics, GI physiology), behaviors (e.g., avoidance, eating, exercise), and higher-order cognitive processes (coping, illness beliefs, information processing of environmental stimuli) influence IBS symptom expression [1]. These biobehavioral processes also interact with each other and are shaped by early life experiences (e.g., trauma, modeling) and the social environment in which the patient lives [2].

It is presumed that IBS symptoms are more optimally managed by addressing the underlying biopsychosocial processes that contribute to symptom expression. By targeting at least one of these pathways linking psychological factors to IBS, psychological treatments effect an improvement in symptoms or other outcome parameters (e.g., daily functioning, health care use, quality of life).

Over the past 5 years, few original clinical trials have been conducted but a number of systematic reviews have assessed the therapeutic benefit of psychological interventions. Psychological interventions that have been studied include cognitive behavioral therapy, hypnotherapy, and psychodynamic interpersonal therapy (Table 1). In hypnosis, the therapist typically induces a trance-like state through systematic verbal cues. This is done through strategically worded suggestions to allow for a change in the subjective experience [3]. This is generally performed in two phases. First, a trained therapist helps the patient achieve deep relaxation through mental imagery or attention diversion techniques. The second

Table 1 Summary of recent findings supporting psychological therapies for IBS

| Study | Study description | Number of trials reviewed | Number of participants | Criteria used to define symptom improvement | Psychological therapy used | Main findings |
|----------------------|--------------------|---------------------------|------------------------|---|--|---|
| Ljotsson et al. [4•] | RCT | N/A | 195 | Improvement in overall severity of gastrointestinal symptoms | Internet-based exposure and mindfulness-based treatment (ICBT), internet-delivered stress management (ISM) | ICBT was more effective than ISM at reducing IBS symptoms because ICBT targeted GI specific anxiety. |
| Ford et al. [5] | Systematic review | 30 | 2189 | Improvement in global IBS symptoms or abdominal pain | CBT, hypnotherapy, psychodynamic therapy, multi-component therapy | Psychological therapies were more effective than control therapies with NNTs ranging from 3 to 4. CBT NNT = 3. |
| Laird et al. [6•] | Systematic review | 28 | Not provided | Degree to which the individual can engage in daily activities regardless of physical symptoms | CBT, hypnotherapy, psychodynamic therapy | CBT produced the greatest improvement in daily functioning in IBS patients. |
| Li et al. [7] | Systematic review | 16 | 1380 | IBS bowel symptom severity | CBT | CBT outperformed passive control in reducing symptoms. |
| Moser et al. [8] | RCT | N/A | 90 | Impact of IBS on patient's lives | Gut-directed hypnosis | Hypnosis outperformed treatment as usual |
| Miller et al. [9] | RCT | N/A | 1000 | Patients were considered responders with a 50-point reduction in IBS symptom severity score | 3-months of gut-directed hypnosis | 76% of patient were responders after 3 months (no control condition). |
| Lee et al. [10] | Systematic review | 7 | 374 | Improvement in global IBS symptoms or abdominal pain | Gut-directed hypnosis | Hypnotherapy had beneficial short-term outcomes. |
| Laird et al. [11•] | Systematic review | 41 | 2290 | Improvement in global IBS symptoms or abdominal pain | CBT, hypnosis, mindfulness, psychodynamic therapy | Psychological therapies provided a significant medium effect on IBS symptoms for short-term and long-term follow-up. |
| Ljotsson et al. [14] | RCT | N/A | 195 | Improvement in overall gastrointestinal symptoms | Internet-delivered CBT (exposure, acceptance), internet-delivered stress management | Exposure-based treatment showed greater improvement in GI symptoms and dysfunctional thinking than stress management. |
| Rutten et al. [15] | RCT | N/A | 250 | 50% reduction in frequency and intensity of IBS symptoms | Home-based hypnotherapy, therapist-led hypnotherapy | Home-based hypnotherapy was non-inferior to therapist-led hypnotherapy. |
| Pajak et al. [16] | Systematic review | 12 | Not provided | Improvement in severity of IBS symptoms | CBT, exposure, hypnotherapy, expressive writing | Minimal-contact therapy was superior to passive control in treatment of IBS. |
| Ahl et al. [17] | Systematic review | 8 | 862 | Improvement in overall IBS symptoms | CBT-based interventions, self-help guidebook | Minimal-contact treatments produce positive results in physical symptom relief. |
| Liegl et al. [18] | Systematic review | 10 | 886 | Improvement in IBS symptoms severity | Guided self-help | Treatment led to medium effect-size decrease in IBS symptoms. |
| Henrich et al. [19] | Systematic review | 48 | Not provided | Improvement in IBS symptoms (pain, bowel dysfunction) | CBT techniques, relaxation, mindfulness, hypnotherapy, self-management, psychodynamic therapy | These techniques had a small to medium effect-size on symptom improvement and a large effect-size on composite symptom improvement. |
| Ljotsson et al. [21] | RCT | N/A | 309 | Improvement in overall gastrointestinal symptoms | Internet-delivered CBT with and without exposure | Exposure-based interventions add additional benefit and are beneficial in the treatment of IBS |
| Lowen et al. [22••] | RCT | N/A | 44 | Improvement in overall gastrointestinal symptoms, GI-related anxiety | Gut-directed hypnotherapy, IBS education | Hypnotherapy was associated with GI symptom improvement and decreased GI-related anxiety. |
| Jang et al. [24] | Sub group analysis | N/A | 43 | Improvement in overall IBS symptoms, changes in heart rate variability (HRV) | CBT, control (IBS education, usual care) | Self-report GI symptom changes correlated with brain activity changes in hypothesized brain regions. CBT resulted in decreased IBS symptoms that correlated with hypothesized changes in HRV. |

phase is the hypnotic suggestion and it is directed at having the patient reach a specific therapeutic goal (e.g., less abdominal pain). For IBS treatment, these verbal suggestions are designed to be “gut-directed.” For example, the patient may be instructed to feel warmth or relaxed muscles around his/her belly. These adaptive bodily sensations are opposed to unpleasant visceral sensations (e.g., pain, urgency, bloating). Psychodynamic interpersonal therapy is most reminiscent of “talk therapy.” It encourages the exploration of interpersonal conflicts. A focus is on improving the patient’s self-awareness and understanding of symptoms and how they are related to emotional difficulties and interpersonal conflicts. The therapist uses the therapeutic relationship, helps to generate insights, and provides encouragement [3].

The class of psychological therapies for which there is most empirical support is cognitive behavioral therapy (CBT). CBT is a brief, highly structured, problem-focused, and prescriptive therapy based on central underlying assumptions. Unlike other forms of psychotherapy, CBT is focused on the present with little time spent discussing past or early life experiences as would be done in psychodynamic therapy [3]. CBT rests on the main assumption that patients have specific skills deficits that render them vulnerable to symptom exacerbations. Second, the patient requires formal instruction in skills for modifying (unlearning) maladaptive information processing errors (e.g., excessive worry) and maladaptive behavioral responses (e.g., excessive avoidance). Last, it is believed that as the patient remediates skill deficits, s/he will achieve symptom relief (Fig. 1). CBT is not one technique, but a family of techniques.

Cognitive techniques refer to interventions that are designed to help the patient learn how to challenge or dispute negatively skewed thinking patterns. These cognitive processes can be modified in a manner that reduces symptoms severity. For example, distortions in thinking could include catastrophizing (overestimating the costs and consequences of negative events), excessive worry, over-responsibility for

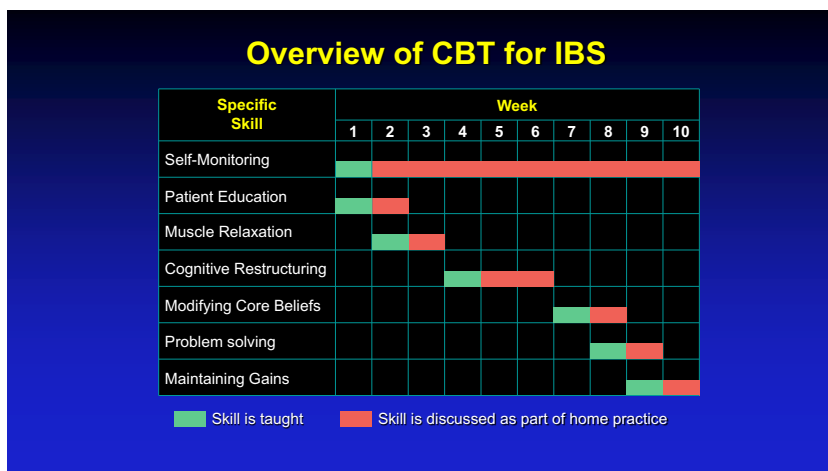
others beliefs/behaviors, and holding unrealistic beliefs regarding the controllability of stressors. Behavioral interventions include such techniques as relaxation training, social skills, and exposure. Over the past 5 years, there has been a focus on exposure-based treatment. Exposure is meant to reduce catastrophic beliefs, hypervigilance, and avoidance of IBS symptoms. Exposure helps patients confront fears in a systematic manner. Basically, the concept behind exposure is that the best way to overcome fear is by facing it head on. Through exposure, patients learn that the feared object or situation is not dangerous or intolerable and that the fear will subside without resorting to avoidance [4•].

Evidence supporting the therapeutic value of psychological interventions comes from a variety of recently completed systematic reviews. Ford et al. [5] identified 30 articles which compared psychological therapies with a control therapy (symptom monitoring, usual care, or supportive therapy). These 30 articles included 32 separate trials that enrolled 2189 adult patients. These trials investigated the efficacy of varied psychological interventions, including CBT, hypnotherapy, and dynamic therapy. For all therapies combined, the number needed to treat (NNT) was 4 to obtain an improvement in global IBS symptoms or abdominal pain, meaning that four patients need to be treated for one of those patients to have clinical improvement of GI symptoms. Nine trials included 610 patients that compared CBT with a control and provided an NNT of 3 to obtain symptom improvement.

IBS and Daily Functioning

More recently, researchers have sought to understand the disease burden of IBS. This is an important issue because many patients who suffer from IBS limit their functioning in ways that can impair their ability to be fully engaged at work, with families, and in their social lives. In a recent systematic analysis, Laird et al. [6•] reviewed 28 RCTs that investigated the impact of therapy (CBT, dynamic, and hypnosis) versus

Fig. 1 Steps to deliver cognitive behavioral therapy for IBS



control conditions (e.g., supportive therapy, online discussion forum, education, waitlist) on mental health and daily functioning. Daily functioning was operationalized as the “degree to which an individual can engage in daily activities regardless of any physical symptoms that may or may not be present.” CBT interventions were evaluated with 21 trials, the most trials in the study. While all psychological treatments were equal in regard to improvement in mental health outcomes, CBT interventions produced the greatest improvements in daily functioning [6•].

Immediate Benefits of Psychological Treatments

While most reviews have been focused on establishing the general efficacy profile of psychological treatments, a number of recent reviews have sought to characterize the therapeutic benefit of specific types of psychological interventions. Li et al. [7] conducted an analysis of CBT interventions that included 16 RCTs and a total of 1380 patients. The authors found that CBT outperformed passive controls (e.g., support, waitlist, medical care) in reducing IBS bowel symptom severity. The authors did not find that CBT was more effective at reducing symptoms when compared to other psychological controls.

Moser et al. [8] conducted an RCT (90 patients) and investigated the impact of gut-directed hypnosis. Patients were randomized to either a treatment that consisted of support or medical treatment alone (SMT) or to gut-directed hypnosis (GHT) with SMT. GHT was superior to SMT alone in lessening the impact of IBS symptoms on daily activities. Additionally, in another investigation of hypnotherapy, Miller et al. [9] enrolled 1000 patients with IBS refractory to conventional medical management of symptoms. Patients were considered responders if they exhibited a 50-point reduction in their IBS symptom severity score. The authors found that 76% of patients had a reduction of at least 50 points. Fifty-eight percent had a reduction of 100 points, and 42% achieved a reduction of 150 points. In a meta-analytic review of the effectiveness of hypnotherapy for IBS, Lee et al. [10] identified seven separate trials, which enrolled 374 patients. The authors evaluated studies that compared hypnotherapy to control conditions. The authors concluded that hypnotherapy has beneficial short-term effects on lessening abdominal pain and overall GI symptoms for patients with IBS.

Durability of Treatment Outcomes

The previous studies have demonstrated that psychological interventions, especially CBT and hypnosis, are effective in lessening GI symptoms. In a value-based health care environment, the durability of treatment gains is an important index of the cost effectiveness of psychological treatments, independent of the initial treatment benefits. Laird et al. [11•]

investigated the short-term (6 months or less) and long-term (6 month or more) efficacy of psychological therapies for reducing GI symptoms or abdominal pain in IBS patients. The authors found 41 trials comprised of 2290 participants. Of those, 14 trials provided data for short-term follow-ups producing a medium effect-size in reducing symptoms as compared to mixed controls. To put this in perspective, those patients who received therapy had a greater reduction in GI symptoms than 75% of the patients receiving one of the control conditions. Ten trials provided long-term follow-up data and also reported medium effects in reducing GI symptom severity or abdominal pain compared to controls. These results did not specifically focus on CBT, but cognitive behavioral strategies and hypnosis were the most commonly tested modalities in the sample. Additionally, Laird et al. [11•] conducted a meta-analysis on the impact of treatment durability due to method of delivery of treatment. They identified three studies that were delivered through an online therapist and found no difference in treatment outcomes at short- and long-term follow-up as compared to in-person interventions.

Delivery Options for Psychological Treatments

As the benefit of psychological interventions has gained broader acceptance, there is an increased emphasis on delivering treatment to a broader range of patients. Unfortunately, the need for psychological interventions is large and only a small proportion of individuals are able to receive services [12]. There are many reasons that patients cannot access care. For example, some individuals live in rural areas or small towns with few providers. Even in large cities, there may be a paucity of trained CBT clinicians, while other patients may be impeded through the cost of quality care, lack of transportation, have other family responsibilities, or health issues that make attending traditional counseling difficult [12]. Unlike traditional therapy, using various technologies may allow treatment to be disseminated more broadly to those in need of services [13]. In addition to using various technologies (e.g., internet, telephone, smartphone apps), self-help interventions and engaging trained non-professional mental health providers to deliver interventions are promising avenues of treatment delivery [13]. Recently, more innovative delivery systems have been developed to disseminate efficacious psychological treatments for IBS.

Ljotsson and his colleagues have examined internet-based interventions as a platform to allow for broader dissemination of treatment. Ljotsson et al. [14] enrolled 195 patients and randomly assigned to internet-delivered cognitive behavioral therapy (ICBT) or internet-delivered stress management (ISM). The ICBT treatment is based on teaching the patient skills to change negative cognitions and dysfunctional controlling/avoidance behaviors. These strategies specifically target cognitions and behaviors stemming from fear of

gastrointestinal symptoms and sensations. ISM was based on the concept that daily stress exacerbates GI symptoms. Thus, patients were taught skills to better manage daily stressors. Both treatments comprised of the patients being provided self-help material and having contact (at least one message per week) with an online therapist. The authors found that ICBT participants showed larger reductions in GI symptoms and dysfunctional thoughts related to IBS symptoms than patients receiving ISM.

In a recently released RCT, Rutten et al. [15] enrolled 250 children to test the effectiveness of home-based hypnotherapy compared to a therapist-led hypnotherapy treatment for IBS. The home-based patients were instructed to practice five-times per week for 3 months using a CD. Those patients in the therapist-led condition met for six sessions over 3 months. The authors found that 1-year post-treatment, the home-based version was non-inferior to the therapist-led intervention.

In one of the few meta-analyses to focus specifically on minimal-contact treatments, Pajak et al. [16] reviewed 12 minimal-contact studies (nine RCTs and three non-controlled trials) that tested “traditional CBT” (six studies), exposure (three studies), hypnosis (two studies), and expressive writing (one study). Expressive writing is writing that is personal and emotional without regard to form/punctuation. The amount of therapist contact varied between studies ranging from reading a self-help book with no-therapist contact to nine sessions of clinician contact (6 of those over the phone). Psychological treatments were compared with a waitlist or control therapy (symptom monitoring, usual care, or online forum). Pajak et al. [16] concluded that minimal-contact therapy was superior to waitlist or usual care in the treatment of IBS.

Additional systematic reviews were conducted that reviewed almost identical studies as Pajak et al. [16]. One of the reviews analyzed eight RCTs (including 862 patients) in which seven studies were CBT-based and one was a self-help workbook [17]. Two of the eight studies had no-therapist contact while the remaining trials had minimal therapist contact. The authors found that minimal-contact interventions are efficacious and outperformed control conditions (e.g., waitlist, standard care, online discussion). However, based on the poor performance of one of the no-therapist contact studies, the authors theorized that interventions with no-therapist contact are likely to perform poorly due to a lack of patient engagement in the program. Liegl et al. [18] analyzed ten trials that enrolled 886 patients. The authors described guided self-help (GSH) as a standard psychological intervention that is delivered by any kind of media that the patient can work on independently (e.g., book, website) and can be supported through limited contact with a health care professional (e.g., face-to-face, telephone, email). The authors found that GSH produced a medium effect-size in reducing IBS symptoms compared to control conditions. Furthermore, based on within group analysis, the authors explained that online-based interventions

were more effective than other self-help formats. Minimal-contact interventions appear to be efficacious in lessening IBS symptoms. Further research is needed to understand if minimal-contact interventions are as efficacious as standard psychological interventions, how much therapist contact is optimal, and what is the most advantageous delivery system (e.g., web-based, workbook).

Additionally, Laird and colleagues used their meta-analysis to investigate the impact of number of sessions on daily functioning in IBS patients [6•] and durability of outcomes at short and long-term follow-ups [11•]. The authors did not distinguish between in-person or phone sessions in either analysis, but other types of interventions were excluded (e.g., self-help, online). The authors did not find a difference in outcomes due to the number of sessions for either meta-analysis. In somewhat contradictory findings, Henrich et al. [19] reviewed 48 RCTs testing psychological treatments for IBS. They found that more sessions were associated with improvements in pain, bowel dysfunction, and a composite GI symptom score, but these treatment gains were not related to overall minutes in treatment (e.g., six 60-min sessions more beneficial vs. four 90-min sessions). This suggests that frequent brief interventions or “check-ins” may hold considerable benefit for patients.

Mechanisms of Therapeutic Change

As the efficacy of psychological treatments for IBS has become established, a focus has shifted to investigating the precise processes through which they achieve positive effects. This is important for several reasons [20]. First, there are many treatments that are beneficial but it may be that similar mechanisms underlying these treatments explain their overall benefits. Second, understanding the process that leads to change may allow providers to optimize treatment benefits. Third, to optimize the generalizability from research to practice, it is important to know which ingredients are needed to make treatment work and what can be altered [20]. Finally, discerning how an intervention works can allow for identification of individuals for whom treatment is most appropriate [20]. Overall, understanding mechanisms will help clinicians isolate the most active ingredients with the greatest therapeutic benefit to patients.

Ljotsson et al. [4•] investigated the mechanisms of change in an internet-delivered exposure-based treatment for IBS. As discussed previously in this article, the interventions were internet-delivered cognitive behavioral therapy (ICBT) and internet-delivered stress management (ISM). The authors theorized that inconsistencies in previous effectiveness outcomes may be due to inadequate understanding of what elements work to exert change in treatment. Many of the psychological treatments for IBS target cognitions or behaviors that are thought to increase stress. Treatments are successful in

reducing stress which leads to a reduction in IBS symptoms. These authors hypothesized that stress specific to IBS symptoms should be the focus of interventions. For example, getting up two hours early to have a bowel movement, avoiding many foods, not going places without bathrooms, etc. The authors found that ICBT was more effective than ISM in reducing IBS symptoms because ICBT targeted gastrointestinal symptom-specific anxiety. According to the authors, it was this anxiety of experiencing distressing gastrointestinal symptoms which led to avoidance that maintained and exacerbated IBS symptoms. Ljotsson et al. [21] also conducted a randomized dismantling control study of internet-delivered therapy with and without exposure. The authors found that exposure added incremental effects to treatment effectiveness.

One meta-analysis reviewed 48 RCTs and investigated which techniques within psychological treatments were effective for IBS symptoms [19]. Initially, they uncovered a list of 41 techniques used in treatment, in which eight techniques were associated with improvement of at least one IBS symptom (e.g., pain, bowel dysfunction, or composite symptoms score) and at least one wellbeing outcome (psychological distress or health-related QOL). The techniques found to be effective are general empathic support, self-monitoring of symptoms, self-monitoring of cognitions, drawing an explicit link between self-monitoring of symptoms and cognitions, providing feedback, relapse prevention or coping planning strategies, assertiveness training, and prompting practice of new behaviors. Interestingly, the technique of providing instruction on how to change cognitions was associated with a worsening of IBS symptoms. The authors hypothesized that helping patients become more aware of psychological and physical factors can empower patients to develop a sense of control [19].

A separate line of research has focused on biological change mechanisms of psychological treatments. Lowen et al. [22••] conducted a study investigating the effect of hypnotherapy and an educational intervention on the brains' response to visceral stimulation in IBS. They enrolled 44 participants with moderate-severe IBS and 20 healthy controls. Each patient underwent a pre- and post-treatment fMRI. The authors found that gut-directed hypnotherapy was associated with GI symptom improvement and decreased GI-related anxiety. Among responders, self-report changes were correlated with attenuation during high-intensity distension in the dorsal and ventral anterior insula. Hypnosis responders showed reduction in posterior insula activation during distension and significant reductions in brain activation during an expectation condition. Following treatment, the IBS brain response to distension was similar to that observed in the healthy controls, suggesting that psychological interventions can "normalize" the abnormal processing and enhanced perception of visceral stimuli in more severe IBS patients.

Given the role of the autonomic nervous system (ANS) on the pathophysiology of IBS [23], there has been effort to study whether CBT works by affecting heart rate variability (HRV). HRV is a physiological variation of heart rate controlled by the autonomic nervous system. Low-frequency bands (LF) are associated with sympathetic activity, and high-frequency bands (HF) are associated with parasympathetic activity/vagal tone [24]. In a previous study investigating IBS-C patients and HRV, the authors found that these patients had lower HF activity and a higher LF/HF ratio than healthy controls [25]. Jang et al. [24] enrolled 43 participants who were randomly assigned to a CBT treatment group ($n = 23$) or a control group ($n = 20$). The patients in the control group received education about IBS and usual care. Those in the control group were also assigned to a small group to be interviewed by one of the investigators. The CBT intervention group met for 8 weeks for 80-min sessions. All patients had their HRV measured and completed the GI Symptom Rating Scale at baseline and weeks 8, 16, and 24. The authors found that the CBT condition resulted in an increase in HF and a significant decrease in the LF/HF ratio. This means that the CBT-treated patients had increased vagal tone and decreased sympathetic power. Furthermore, these HRV changes corresponded to hypothesized decreases in IBS symptoms. The authors suggest that HRV may be a useful objective marker to assess the response to CBT of young patients with IBS-C. The authors also indicated that ANS dysfunction might be able to be reversed with CBT in a young population of IBS-C patients. The authors believe that a young population is amenable to treatment because the duration of ANS dysfunction is shorter and the related physiologic changes are not as severe as in an older-aged population [24].

Conclusion

Twenty years of research support the efficacy of psychological therapies for IBS symptoms. Not only have psychological treatments been found to be efficacious but also the benefits are maintained through long-term follow-up. Recent research also supports the benefit of minimal-contact or self-directed interventions for lessening symptoms. This finding is important because many patients may not have access to traditional one-to-one psychological interventions for IBS due to geographic location, cost, or absence of qualified clinicians. These results are promising but future trials need to investigate the most optimal dose of sessions, type of therapist contact (e.g., face-to-face, phone, email), and delivery method (e.g., web-based, workbook, smartphone). The question still needs to be answered if self-administered/minimal-contact interventions are as efficacious as standard psychological interventions. This is a focus of an ongoing NIH clinical trial [26].

While no class of psychological treatment has been shown superior, CBT and hypnosis have received the most scientific support. Despite their efficacy profile, there are still more questions that need to be answered such as what are the precise change mechanisms that account for therapeutic change. Ljotsson [4•] and his colleagues have conducted mechanistic research with exposure-based treatment but there is little understanding of change mechanisms influencing other behavioral treatments. Whether these change mechanisms include central (alterations in brain structure and function) or peripheral (motility) factors is an exciting area of future investigation.

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Compliance with Ethical Standards

Conflict of Interest Christopher Radziwon and Jeffrey Lackner report no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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