A Psychological Approach to Functional Illness

19

Anna Marie A. Carlson and Gregg A. Tkachuk

A History of Psychological Conceptualization of Functional Illness

The biomedical model, introduced into medical thinking by Descartes in the seventeenth century, assumes a dualistic view in which somatic symptoms are considered either somatogenic (i.e., the result of physical pathology), or in the case where no medical cause can be ascertained, psychogenic (i.e., psychological in origin). Traditional medicine has adopted this dichotomous, Cartesian mind–body dualistic view. Psychogenic views of unexplained physical symptoms have been inculcated since the formulation of psychodynamic theory and have been criticized as overly stigmatizing patients and providing too narrow an explanation, particularly for chronic medical conditions where no cure is available. Nonetheless, this view remains pervasive both within and outside of the health care system.

The Biopsychosocial Perspective

Human beings differ in their expression of physical symptoms, their propensity to seek medical care, and their responses to medical treatments. Melzack was instrumental in expanding the dualistic mind- or body framework in his study of chronic pain. The Gate-Control Theory [1, 2] encouraged consideration of the psychological factors in the pain experience through interaction with modulation of ascending

A. M. A. Carlson (✉)
Department of Clinical Health Psychology, University of Manitoba, Brandon, MB, Canada
e-mail: annamarie.carlson@umanitoba.ca

G. A. Tkachuk
Department of Clinical Health Psychology, University of Manitoba, Winnipeg, MB, Canada

B. W. Blakley, J. E. Blakley (eds.), *Functional Illness of the Head and Neck*,
https://doi.org/10.1007/978-3-031-12998-8_19

and descending pathways in the central nervous system. In 1999 [3], Melzack reported on the Neuromatrix Theory of pain, which combined gate-control theory with an expanded view of the brain's neural network combined with the body's natural adaptations to stress. This theory has continued to be widely supported and offers an explanation for a number of chronic pain conditions such as fibromyalgia, and migraine.

Similarly, Engel [4] proposed a biopsychosocial perspective to explain both the disease process and the subjective experience that a disease is present, including how an individual and the individual's wider social network perceive and adapt to physical symptoms and disability. The hallmark of the biopsychosocial model is a complex, dynamic, and reciprocal interaction of biological, psychological, and social variables.

Functional Somatic Syndromes

Based on the earlier work of Kellner [5–7] the term *functional somatic syndrome* (FSS) was first introduced by Barsky and Borus [8] to describe categories of bodily symptoms frequently encountered in many areas of medical practice that have no well-defined structural organic pathology. Nonetheless, the presence of functional somatic symptoms results in considerable distress and disability, rendering patients and medical practitioners alike susceptible to frustration due to a lack of effective treatments. Common bodily symptoms include pain, dizziness, heart palpitations, gastrointestinal distress, weakness, and generalized fatigue of varying levels of severity. Some patients present with a single persistent symptom, or set of symptoms from the same organ system, while others describe multiple symptoms relating to several organ systems. Accompanying features may, but do not necessarily, include high health anxiety, bodily checking behaviors, high rates of anxiety and/or depression, and personality disorders. As a result, quality of life tends to be lower, disability rates higher, and long-term outcomes poorer in those with multiple, and more severe, bodily symptoms [9].

There is a high comorbidity between functional somatic symptoms and psychological disorders. For example, Kleykamp et al. (2021) [10] reported that over half of individuals with fibromyalgia experienced depression in their lifetime. Carta et al. [11] reported a significant risk of lifetime prevalence of mood disorders (65%), post-traumatic stress disorder (PTSD) (8.4%), and panic disorder (28.2%) in individuals with fibromyalgia, and referenced the possibility of vulnerability to chronic stress. Janssens et al. (2015) [12] reported that mood and anxiety disorders are more prevalent in individuals with FSS, however, the authors found most persons with FSS do not have mood or anxiety disorders. Adding to the disease burden of individuals with FSS, there is also consideration of comorbidity with other functional disorders (39–76%) [10].

Etiology of FSS

It is beyond the scope of this chapter to review all available etiological models of FSS. The factors most notably included for consideration in traditional models include predisposing, perpetuating, and precipitating factors as well as the dynamic and reciprocal interplay among these factors in explaining the experience of bodily distress [9, 13, 14].

Predisposing factors include genetics, early experience with illness, vicarious learning of familial illness behavior, cultural views of illness, a history of adverse childhood experiences including physical or sexual trauma, neuroticism (i.e., heightened reactivity to stressors, tendency toward experiencing negative affect such as anxiety or depression), and a general predisposition to experience distress related to bodily symptoms or health anxiety.

Perpetuating factors include central nervous system sensitization to previously encountered stressful stimuli and positive and negative feedback loops involving the hypothalamus–pituitary–adrenal (HPA) axis in the regulation of cortisol and release of inflammatory cytokines. Features of attention, perception, focus, health-related attributions, illness-related beliefs, and behavioral responses to illness such as avoidance and deconditioning have also been implicated. The latter of these components are typically targeted for change in behavioral treatment approaches.

Precipitating factors are events that are hypothesized to trigger the start of the self-perpetuating cycle. These are essentially major life events or persistent daily stressors that confront the sympathetic nervous system such as illness, accidents, injuries, significant losses, work, family, or relationship stressors, and perceived threats to one's well-being. Maladaptive coping responses to these events can potentially lead to a chronic or prolonged state of activation that is maintained by cognitive factors (i.e., perseverative worry, rumination, or catastrophizing) and experiential (i.e., cognitive, emotional, and behavioral) avoidance that can also be a focus of psychological treatment.

As mentioned earlier, another important feature of etiological models is the dynamic interplay among these factors in explaining the experience of bodily distress. This can be characterized as an autopoietic process of symptom generation and perpetuation [13]. As an example, consider an individual with a predisposition to experience bodily distress who is subjected to an adverse childhood experience or observes a parent responding with high anxiety to a relatively minor illness. These early life events could sensitize the central nervous system to lower the threshold for symptom detection. A precipitating stressor later in life such as a minor injury or relatively common viral illness, loss of a loved one or important relationship triggers the experience or expectation of physical symptoms, which are catastrophically misinterpreted as signifying danger or serious disease, and a significant emotional response that has previously been paired with physical symptoms through classical conditioning. A maladaptive coping response such as frequent

bodily checking behavior or seeking frequent reassurance from medical providers and significant others temporarily reduces anxiety but reinforces the further need for such reassurance seeking whenever similar symptoms inevitably resurface. The individual also seeks to avoid important life activities that may provoke physical symptoms, and this avoidance is maintained by operant conditioning. Over time, physical deconditioning and increased disability and depression are the results. This further sensitizes the individual by lowering the threshold for symptom detection and accompanying emotional distress. The individual becomes stuck in the perpetual cycle of symptom maintenance, anxiety, and despair [9].

More recent etiological models attempt to expand upon the traditional models to address how symptom perception is initiated and why symptom-related distress is maintained despite reassurance from physicians. One influential model is based on the idea that the central nervous system is a predictive coding machine whereby disorders of interoception can occur when peripheral sensory inputs do not match the centrally based (i.e., central nervous system) predictions [15]. It proposes a mechanism whereby FSS patients may construct the perception of bodily symptoms in the absence of peripheral physiological sensations. In this view, somatic symptoms are essentially considered to be "somatovisceral illusions" or memories of previous sensations. Another relatively recent model addresses the question of why symptom-related distress persists despite medical reassurance and negative test results [16]. It proposes that, while patients with FSS may be initially relieved by medical reassurance, they later negatively reappraise the information presented by the physician and thus, reinvoke the original concern. They further suggest that this process eventually renders FSS patients "immune" to medical reassurance.

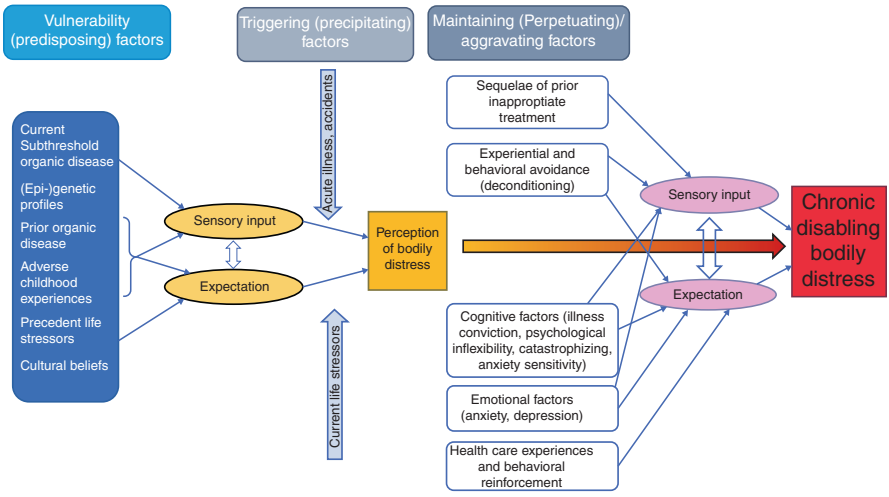

Fig. 19.1 Schematic model of the etiology of bodily distress. Note: The distinction between vulnerability/triggering and perpetuating/aggravating factors is to some extent artificial as most factors influence on both sides. Adapted from Henningsen et al. [9]. Reproduced with permission from S. Karger AG, Basel

Within a comprehensive framework that includes both the traditional and contemporary models, some etiological factors will preferentially act either via centrally or peripherally acting routes, but most can influence both routes (see upper and lower parts of Fig. 19.1, called "sensory input" and "expectation").

Psychological Assessment of Functional Illness

As previously outlined, FSS symptoms may be influenced by a number of autopoietic biopsychosocial factors and as such the assessment will focus on these factors. The purpose of the assessment is to gather information about the physical symptoms (see Table 19.1), level of distress and dysfunction caused by the symptoms, psychological functioning and psychological comorbidities, social situation, general background and upbringing, early life experiences with health and physical symptoms, and coping skills [17]. The intention in this phase is to have information to facilitate differential diagnosis, create a conceptualization of the biopsychosocial factors influencing the physical symptoms, begin forming a therapeutic alliance, and be able to start direct treatment planning [18].

Table 19.1 Targets of assessment in psychological interview

• Physical symptom assessment
• Description of symptoms
• Description of symptom onset and progression
• Frequency, severity, duration of symptoms
• Triggers/patterns of symptoms
• Perception of cause
• Medical investigations and results
• Understanding and level of acceptance of functional diagnosis
• Previous treatments (helpful and unhelpful) – medications for symptoms (prescription and nonprescription), patterns of use – allied health, and alternative treatments
• Dysfunction/limitations/distress linked to the interpretation of the physical symptoms and/or by the symptoms themselves
• Strategies employed to cope with/influence symptoms
• Goals for symptom reduction (e.g., total absence, 50% improvement, and improved function)
General medical history
• Diagnoses, other functional, and otherwise
• Limits to function as result of other medical conditions
• Medications
• Hospitalizations, surgeries, notable procedures
• History of head injury
• Relationships with/attitudes towards health care providers
• Significant frustrations with receiving health care, diagnostics, etc.
Lifestyle assessment
• Sample daily schedule
• Sleep

(continued)

Table 19.1 (continued)

• Exercise
• Appetite
• Recreational substances including caffeine, alcohol, and nicotine, and substance abuse history
Psychological symptoms and personality functioning
• Current mood
• Symptoms of depression
• Symptoms of anxiety – How does a person typically experience stress? Body symptoms? – Symptoms of generalized anxiety disorder (GAD) and Panic disorder – obsessive-compulsive disorder (OCD), Social Anxiety, Specific phobia
• Trauma history – Early childhood, assault, accidents, medical procedures – Symptoms of PTSD
• Suicidal/homicidal ideation – Plan, intent, means, history of same – Current safety
• Psychological/psychiatric including treatment history
• Life stressors
• Changes in symptoms/stressors/mood in timeline with functional symptoms
Social history
• Family of origin
• Family history – Medical, mental health, and substance use – Family's understanding of/stigma toward health medical and mental health concerns
• Current living situation
• Support systems/significant relationships
• Current source of income, financial hardship
• Developmental and social history
• Experience with illness, physical symptoms (if not obtained in medical history)
• Education history
• Work history
• Hobbies/recreational life
Treatment indicators
• Goals of treatment such as "miracle cure", and/or reduction of medication, symptoms, distress, dysfunction, etc.
• Relative resistance/acceptance to mind-body connection (biopsychosocial model of treatment)
• Motivation for treatment—willing to take active steps for change
• Secondary gain
• Function/reinforcement of symptoms in environment
• Active psychosis, untreated bipolar disorder
• Adequate physical health
Behavioral observations
• Pain/symptom behavior (grimacing, wincing, rubbing, and bracing)
• Use of assistive devices (i.e., walking aid, earplugs, and neck brace)
• Level of openness in sharing personal details, sense of insight into mind-body connection
• Cognitive status
• Mood – range of affect – stated mood with observable mood

Patients seen in this setting are likely to be hesitant to see the role psychology may play and are concerned the referral implies that their symptoms are "all in their head"—suggesting a feigning or imagination of the symptoms, or that a potentially serious condition is being ignored by a referral to psychology. These patients typically will report high distress from their symptoms and are keen on finding a medical "fix". Assessment may begin with inquiring as to the patient's understanding of the referral and thoughts about meeting with a psychologist [18].

As such, it is typically prudent to initially focus the psychological assessment on the physical symptoms before moving into a more traditional psychological and lifestyle evaluation. This information is typically gathered through clinical interview, self-report symptom questionnaires and/or symptom diaries of varying length and symptom focus. The most widely used patient self-report scales to assess for severe health anxiety/somatization include the Whitely Index [19], Illness Attitudes Scales [20], and Health Anxiety Inventory [21] and these measures have been shown to have good psychometric properties [22]. Self-report scales are also available to assess psychological constructs that may be associated with higher symptom intensity and disability such as anxiety sensitivity [23] and pain catastrophizing [24]. Behavioral observations of the patient are also typically included in the assessment.

Psychological assessment is often a dynamic process and typically continues over the course of treatment. Over time, patients become more invested in understanding their own triggers and tend to remember more about circumstances that corresponded to symptom onset as they become aware of physical and emotional experiences during the course of therapy [18].

As reviewed previously, individuals with functional illness are likely to have a comorbid psychological diagnosis such as an anxiety or depressive disorder. A number of other DSM-5 diagnoses may be indicated specifically in relation to the functional symptoms. The key differentials are related to the timing of symptom onset, the context in which the symptoms occur, and distress related specifically to

Table 19.2 DSM-5 diagnostic considerations for functional symptoms

Adjustment disorder • when physical symptoms came first and changes in mood and anxiety are related to the stress of having the physical symptom(s)
Trauma-related disorder • if physical symptoms began within the context of post-traumatic distress
Other anxiety disorder • if symptoms are transient and/or only occur in the context of other anxiety disorder (i.e., tinnitus during social interactions for someone with social anxiety disorder)
Depressive disorder • full criteria for disorder needs to be met to diagnose instead of adjustment disorder even if a change in mood seems connected to the symptoms • if a physical symptom is consistent with somatic symptoms of depression

(continued)

Table 19.2 (continued)

Conversion disorder (functional neurological disorder) • voluntary motor or sensory symptoms inconsistent with known medical condition, cannot be accounted for by another mental or medical disorder, and are distressing, impairing, or subject to medical investigation • coded with and without the psychological stressor. Criteria for PTSD should not be met
Illness anxiety disorder • physical symptoms are mild at best but the individual is concerned about acquiring an illness • typically strong checking and avoidance patterns related to the physical symptoms
Somatic symptom disorder • physical symptoms are present, often in more than one physical domain • symptoms cause significant distress and limitations characterized by concern regarding the seriousness of symptoms, anxiety about health and symptoms, and significant time and energy dedicated to symptoms or health concerns
Psychological factors affecting a medical condition • an underlying medical condition exists but behavioral or psychological factors affect condition (i.e., someone with mild arthritis in C-spine experiences significant muscle tension in neck due to anxiety thus producing significant neck pain)
Factitious disorder (on self or other) • falsification of physical symptoms in self or another, with identified deception
Psychotic Disorder with somatic delusion or hallucination • most common somatic delusions are: foul order from body (i.e., halitosis), infestation in body, body part being misshapen, or body parts not functioning properly (e.g., circulatory system) [25] • the description or cause is likely to be bizarre (e.g., the pain is from an alien lifeform in my abdomen) • related behavioral observation present (e.g., damage to skin/tissue from self-treatment)
If patient in not particularly distressed from or limited by functional symptoms no diagnosis may be indicated

the physical symptoms or the perceived cause of the symptoms [25]. The DSM-5 transitioned away from the classification of somatoform disorders, which implied psychogenic origin, to somatic symptoms and related disorders.

The ICD system has similar diagnoses for distress from physical symptoms or anticipation of medical illness. The anticipated ICD-11 contains a proposed "bodily distress disorder" appearing in the mental health section, which is similar to the DSM-5 somatic symptom disorder [26]. A "bodily distress syndrome" is proposed to appear in the health care section as a replacement for medically unexplained somatic complaints [27].

Psychological Treatment of Functional Illness

There are a variety of psychological treatments that have been researched by category of physical symptom (i.e., pain and tinnitus), diagnosis (i.e., migraine, temporomandibular joint (TMJ), and fibromyalgia), and aligned psychological diagnosis (i.e., somatic symptom disorder). All therapies have in common a desire to intervene at the biopsychosocial level, by impacting the stress system and considering/targeting thoughts and interpretations, behavior, emotion, and physical sensations.

Below is a summary of different therapies that are designed to treat functional syndromes and functional limitations. Other treatments within each treatment orientation exist for comorbid diagnoses (i.e., generalized anxiety disorder) but are not reviewed here.

Cognitive-Behavioral Therapy

The cognitive-behavioral model is compatible (Fig. 19.2) with the biopsychosocial model in terms of the dynamic reciprocal relationship among physiological, psychological, social, and behavioral factors and how these variables function to predispose, precipitate, and perpetuate FSS [13, 14]. The model posits that there is a reciprocal and dynamic interplay of the thoughts, emotions, behavior, and physical sensations.

For example, an individual may be in a situation in which they notice physical sensations. Then these sensations may be catastrophically misinterpreted as being reflective of a serious disease, these responses will lead to emotional distress in the form of increased anxiety and/or depression, and the individual will make efforts to reduce the symptoms through avoiding daily activities or frequent symptom checking. These in turn can lead to increased preoccupation with symptoms, increased avoidance, physical deconditioning and disability, which in turn makes it more likely that anxiety and the physical symptoms will continue thus keeping this interplay continuing in a loop.

Furthermore, environmental/social variables such as how others respond to the individual and/or symptoms play an important role in whether maladaptive thoughts and behaviors are maintained. Cognitive behavioral treatment focuses on symptom reduction by helping the patient to identify, examine, and reshape thoughts and

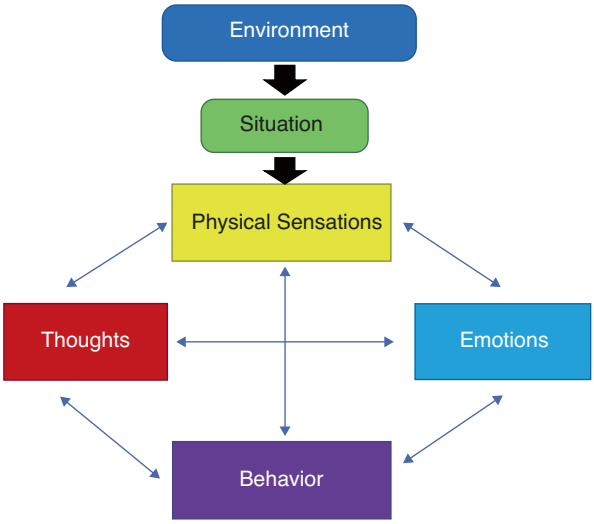

Fig. 19.2 Cognitive-behavioral model of treatment

beliefs about symptoms through education, guided discovery, setting up personal experiments, exposure to physical sensations, response prevention of bodily checking behavior, considering alternative explanations for the symptoms or perceived inability to cope with them, considering how the patient's behavior may be contributing to or maintaining symptoms, and increasing participation in functional activities of daily living. These strategies are often combined with relaxation training (or other emotion control strategies) aimed at reducing emotional distress. Treatment can range anywhere from 6 to 20 sessions depending on the severity and chronicity of bodily distress.

Cognitive behavioral treatment, in individual or group form, has been demonstrated to improve symptoms and functioning, with small to moderate effects sizes in meta-analytic reviews, for a variety of FSS presentations including generalized bodily distress [28–30], as well as singular syndromes such as fibromyalgia [31–33], chronic fatigue syndrome [34– 36], irritable bowel syndrome [37–40], burning mouth syndrome [41], noncardiac chest pain [42], dizziness [43], and tinnitus [44–46].

"Third-Wave" Cognitive-Behavioral Therapies

Mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), and acceptance and commitment therapy (ACT) are psychological interventions that have at their core the practice of mindfulness, an acceptable way of relating to whatever is happening in the present moment without trying to change it, push the experience away, or cling to it. All three traditions agree that the purpose of meditative practice is not necessary to induce relaxation, but to facilitate the ability to notice (e.g., attention) and accept one's own experience and automatic reactions to that experience which may include thoughts, sensations, emotions, or behavior. These automatic reactions are thought to produce and/or amplify distress from an original experience. Through acceptance of one's experience (rather than trying to change or control the experience), including unpleasant aspects, one can cultivate intentional, compassionate responses to difficulties which then typically reduce distress and improve function.

Acceptance and Commitment Therapy

Acceptance and commitment therapy (ACT) (Fig. 19.3) is a newer approach within CBT consisting of mindfulness and acceptance intervention strategies. ACT is fundamentally guided by relational frame theory [47] and the psychological flexibility model (PFM; [48]). The PFM postulates that human suffering inevitably results when efforts to avoid distressing thoughts, feelings, and physical sensations fail to provide long-lasting relief. The PFM consists of six interrelated processes: acceptance, cognitive defusion, contact with the present moment, self as context, connecting with personal values, and committed action (see Fig. 19.3).

Acceptance is the willingness to embrace whatever internal experience shows up, be it a thought, feeling, or physical sensation without defense, regardless of whether it is positive or negative. Cognitive diffusion is the name given to the

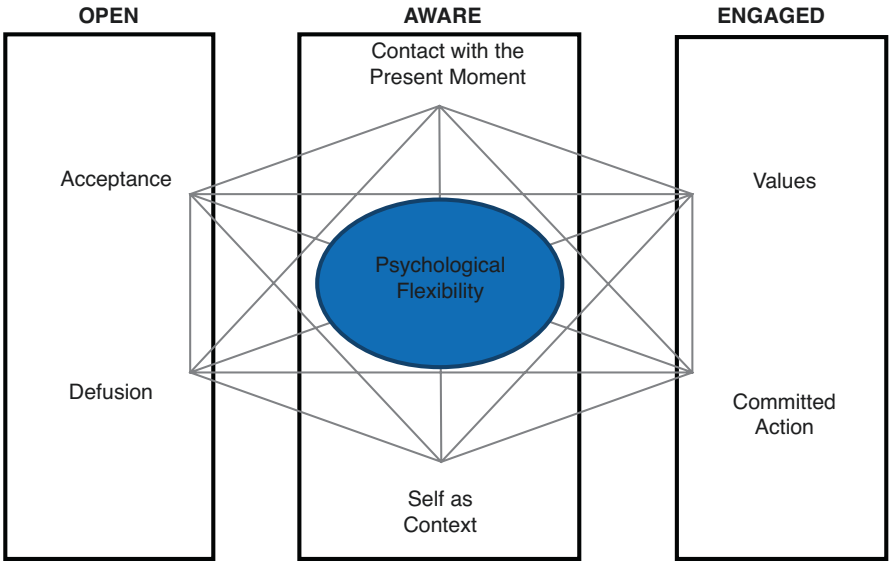

Fig. 19.3 ACT model of treatment

process of holding thoughts lightly and seeing them for what they are—mental representations of events rather than the events themselves. Gradually thoughts are seen from a distance and their literal importance is undermined in favor of doing what matters in life. Contact with the present moment reflects a willingness to stay with one's present moment experience regardless of distractions of the mind or urges to avoid unpleasant experiences. Self as context, or perspective taking, is the process of observing that there is a transcendent self that is separate from one's thoughts, feelings, physical sensations, roles, urges, or physical body. These aspects of experience change over time while the observing aspect of self does not. Values reflect the people and things that provide a deeply personal sense of meaning and purpose to the patient. They serve both an aspirational and motivational function for the patient. Committed action is the process of goal-directed action undertaken in the face of barriers that are guided and fueled by one's values.

ACT uses metaphors, experiential paradox, and experiential exercises to undermine the literal content of language and enhance contact with present moment experience in the service of living according to one's chosen values. It is considered a transdiagnostic, process-oriented approach to therapy that typically does not employ a session-by-session protocol. Rather it maintains a flexible approach that can be tailored to the individual needs of the patient.

In ACT for FSS, there are several therapeutic goals including helping the patient to identify previous attempts to control/avoid bodily symptoms and related emotional distress and come to their own conclusions regarding how successful these have been over time. In doing so, attachment to control strategies is undermined and willingness engendered, to abandon unworkable attempts to control/avoid distressing physical and emotional symptoms. Through this process, patients open up to alternative ways of responding to physical symptoms and related emotional distress

in order to live more freely in accordance with their chosen values (i.e., psychological flexibility).

ACT is a relatively new approach to treatment in physical medicine compared to traditional cognitive behavioral therapy. However, in the past 15 years, in an effort to generally improve upon the relatively consistent but small effect sizes observed in studies of traditional cognitive behavioral treatments, there have been a considerable number of randomized controlled trials of ACT for FSS, particularly in the area of chronic pain. ACT for chronic pain, including fibromyalgia and headache, has been found to be more clinically effective than usual care or wait list control conditions on a range of outcome measures (i.e., pain, disability, quality of life, pain interference, anxiety, and depression) with small to large effect sizes at both post-treatment and follow up intervals [49, 50]. There have been an insufficient number of studies directly comparing ACT with CBT to determine whether one is more effective than the other at this point.

In a theoretical and empirical review of the cognitive behavioral model of treatment for medically unexplained symptoms, Deary et al. [13] suggested that because of its nature as a treatment for distress tolerance, ACT could be an effective treatment for FSS. Since that review, ACT has been investigated as a treatment for a variety of FSS in several randomized controlled trials including patients with health anxiety, generalized bodily distress, irritable bowel syndrome, and tinnitus. For health anxiety, ACT demonstrated large effect sizes regardless of it being compared to wait list [51] or an active control group [52], while for generalized bodily distress the effects were moderate [53, 54]. In three RCTs for IBS, ACT outperformed active control conditions with moderate to large effect sizes [55–57]. Finally, in the area of tinnitus, ACT conveyed a large effect over tinnitus retraining therapy (TRT) in one study [58], while in another [59], online ACT was as effective as online CBT, both with moderately large effect sizes.

There are several barriers to delivering effective behavioral treatments such as ACT for FSS, including the number of sessions, a dearth of trained clinicians and multidisciplinary treatment centers, the stigma associated with mental health care, poor treatment adherence, prohibitive costs, reduced mobility, prohibitive distance, and lack of transportation. One solution has been to offer ACT in a 1-day workshop format [60] that enables more flexible dissemination of treatment in clinical settings to enhance adherence. One-day ACT workshops have been implemented for a wide variety of conditions including diabetes [61], multiple sclerosis [62], migraine [63–65], vascular disease [66], post-surgical pain [67, 68], and inflammatory bowel disease [69], with encouraging results reflecting the improved quality of life, decreased emotional distress, and improved disease management.

Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT)

MBSR was developed by Jon Kabat-Zinn primarily to provide stress reduction to individuals with medical conditions to see what they may be able to do for themselves (in addition to what medicine may be able to offer) after learning to notice and understand their bodies [70]. MBCT was developed as a way to prevent relapse in those with persistent depression who were triggered by difficult daily events [71].

MBSR and MBCT are typically led in 8-week group formats and include psychoeducation, and formal meditative practices, during which participants are encouraged to do practice between sessions. MBSR typically includes a yoga practice as a meditative component whereas MBCT integrates elements of more traditional cognitive-therapy such as identifying cognitive distortions. Both encourage body-oriented and experiential practices that encourage tolerating unpleasant physical sensations while encouraging movement and developing insight into one's patterns, behavior, symptoms, etc. [72].

The ongoing study of MBSR and MBCT into pain and other functional symptoms is driven by the effects of the treatment to reduce activation of sympathetic arousal including decreased blood pressure, reduction in immune-inflammatory markers through formal meditative practices and reduction in stress/anxiety generation through the acceptance techniques and psychological flexibility [73–76].

Systematic reviews and meta-analyses have concluded that the benefits of mindfulness-based interventions (MBIs) for patients with FSS, excluding tinnitus, have offered mixed results. For example, Veehoff et al. and Frostholm et al. have suggested the benefits are inconsistent at best and when there were benefits, they tended to be relatively small [50, 77]. However, others have reported moderate to large effect sizes for medically unexplained symptoms and FSS [78, 79]. Research has suggested that MBCT is superior to CBT in myalgic encephalomyelitis [80]. Several randomized controlled trials have demonstrated that MBCT is an effective treatment for tinnitus with small to moderately large effect sizes [81–83]. An RCT of MBCT for health anxiety reported a medium-sized positive outcome when compared to treatment as usual [84].

Compassion-focused therapy is another "third wave" treatment that incorporates aspects of mindfulness and cultivating compassion for oneself and adjusting to limitations associated with their pain [85]. Third-wave therapies may be recommended more often for individuals who have previous histories with CBT, and for whom efforts to control emotional and physical sensations (often seen through behavioral avoidance, high medication and/or substance use) are negatively impacting their life.

Hypnosis

Hypnosis is generally defined as "a therapeutic technique in which clinicians make suggestions to individuals who have undergone a procedure designed to relax them and focus their minds" [86]. During this state, an individual is more amenable to suggestions that can influence perception, thought processes and behavior, as modulated by the peripheral and central nervous systems regardless of organic cause [87]. As this relates to functional illness, suggestions can be provided to alter the perception of unpleasant stimuli and/or create a general sense of calm, thought processing that may amplify the sensations (i.e., interpretations of the nature of the symptoms, focus on limitations, and losses), or behavior that improves the comfort or quality of life of the sufferer. The effects of hypnosis can be objectively studied through PET scan imagery, changes in vascular activity, and inflammatory response [82]. Jensen (2011) suggests that truly psychogenic pain is best treated with psychotherapy with

hypnosis as an adjunct [87]. Targets may be reducing symptom annoyance, improving symptom control, and reducing overall stress as examples. In a recent review of the use of hypnosis, Flynn (2018) suggested that hypnosis with or without additional relaxation strategies provided improvement reduction in headache activity, and improved quality of life with no adverse effects reports in a relatively short time (1–4 sessions) [88]. Maudouz, Bonnet, Lhonneux-Ledoux and Lefebvre (2007) used hypnosis to assist tinnitus patients in modulating sound intensity in 5–10 sessions and reported improvements for participants with mild through "catastrophic" impairment from tinnitus [89].

Several systematic reviews and meta-analyses have concluded that hypnotherapy/guided imagery training offers small to moderate benefits for irritable bowel syndrome [37, 38, 90–92] and strong evidence for efficacy for fibromyalgia [93, 94].

Biofeedback

Biofeedback is a treatment that focuses on building awareness of physiological processes associated with nervous system functioning (i.e., muscle tension, heart rate, and perspiration), through the use of externally located sensory equipment. Individuals can then learn to influence these processes, with the potential for symptom reduction and relief. Many have argued that its philosophy truly embodies the biopsychosocial model [95]. Treatment typically begins with a psychophysiological assessment which may include muscle tension (as measured by surface electromyography (sEMG)) in facial muscles, neck, and shoulders; heart rate; heart rate variability; breathing rate; finger temperature; and skin conductance in response to a series of stress-inducing tasks. Education is provided on the role of muscle use and emotional stress in producing muscle tension which can produce bothersome symptoms. The active phase of treatment involves breathing training, observing changes related to muscle-specific variables (i.e., posture, talking), along with using other relaxation skills, mindfulness, or noticing cognitions while attending to physiological readings (see [17, 96] for detailed protocols). Biofeedback-assisted training has been studied for tinnitus [97–100], temporomandibular joint [101], headaches [102], and fibromyalgia [103] among other anxiety, pain, functional conditions, and injury rehabilitation. A meta-analysis of self-management treatments concluded that biofeedback did not add additional benefit to other self-management interventions such as psychosocial and jaw relaxation and may not justify the added cost of the equipment [104]. These authors also consider whether the administration of biofeedback from a psychologist or medical provider may influence the receptivity of patients to the intervention.

Eye Movement Desensitization and Reprocessing (EMDR)

EMDR is a therapeutic approach that was originally developed for the treatment of PTSD and is based on the Adaptive Information Processing Model (AIP; [105]). In brief, the AIP posits that traumatic events are stored in a fragmented fashion in one's

memory, and activation of the processing system through the EMDR procedures will lead to adaptive resolution of the event therefore reducing the PTSD symptoms. The goal of treatment is to reduce maladaptive learning and distress, and strengthen adaptive beliefs associated with traumatic events. The treatment itself follows standardized procedures. Initially affect regulation techniques are taught. Then the active component includes focusing simultaneously on images, thoughts, emotions, and/or bodily sensations associated with the traumatic event along with bilateral stimulation (BLS) such as lateral eye movements across the visual field. EMDR's use in treating functional symptoms would be targeting traumatic (if applicable) events that play a role in symptom onset such as previous injury or illness associated with symptom onset, unfortunate medical experiences, enhancing coping with symptoms by reducing distress related to thoughts of being helpless, worthless, etc., target the physical sensations themselves, reduce fears for the future, and/or challenge secondary gain. When distress and/or dysfunctional learning is removed from the above targets, then an adaptive belief (e.g., I can cope) is reinforced. Then the patient reports any residual physical sensations that are present while engaging in BLS. See Luber (2019) for EMDR protocols for treating somatic and medical-related conditions [106].

Several studies have suggested that EMDR is helpful in the treatment of chronic pain, reducing disability and associated anxious and depressive symptoms [107–109] EMDR has demonstrated success as an abortive treatment for migraine compared to standard care medications [110] and decreased migraine frequency and duration [111]. EMDR was compared to Duloxetine in women with SSD and found to provide greater symptom reduction relative to the duloxetine group at 6 weeks [112]. A recent review [113] suggested that EMDR has been effective at reducing tinnitus-related distress. Luyten et al. [114] reported that EMDR combined with tinnitus retraining therapy (TRT) was as effective as CBT with TRT. EMDR was found to be effective in treating functional neurological conditions in a recent description of case examples [115].

Generally, the literature base suggests that EMDR is a promising treatment for functional syndromes particularly if the pain is a symptom, but published evidence has been criticized for not having large-scale randomized clinical trials [104]. Individuals with functional symptoms that are clearly part of a trauma-related disorder should be offered psychological treatment specifically for PTSD in addition to treatment for functional distress.

Summary of Psychological Treatments

A variety of psychological treatments are continually being studied and developed for the treatment of FSS allowing the opportunity for choice to patients given their own conceptualization of functional symptoms, psychological comorbidities, as well as time and goals for treatment. Other models of psychological therapy, such as psychodynamic therapy, have been used in the management of functional syndromes, however, only treatments provided by the authors were presented here. Individuals with functional symptoms may still benefit from treatments targeting

other comorbidities such as PTSD, conversion disorder, insomnia, major depression, personality disorders, and specific anxiety disorders.

Strategies for Health Care Providers (HCP)

Assessment

Functional somatic syndromes and non-specific bodily distress can account for up to 25% of primary care and 50% of specialist practice [9]. The interaction between the health care provider(s) and the patient can play a significant role in whether or not the patient will continue to seek further referral medical assessments or consider the role of psychosocial factors [116]. It is useful to physically examine the patient, even if medically unexplained symptoms are suspected. This will ensure that no clinical signs are missed and help to reassure the patient that the complaint has been taken seriously and adequate assessment has taken place. Once a patient has been carefully assessed, misdiagnosis is uncommon (estimated 0.5%) [117] but more likely to occur in patients with comorbid mental health presentations [118]. While investigations are important, a balance must be struck between the risk of misdiagnosis and the potential for increasing the patient's fear of disease (i.e., iatrogenic psychological harm). Initial impressions of functional symptoms can be offered. If additional tests are ordered, the reasons for the diagnostics should be explained with a sense of expected (negative) results [9].

The assessment should also explore the patient's beliefs and fears about the underlying disease, and acute anxiety towards the same. This information can inform the conceptualization of an additional psychological diagnosis and can provide guidance on areas to provide reassurance to the patient. The patient should also be asked about psychological symptoms, but this is best done only after taking a history of physical symptoms so that the patient will not feel that their concerns about the physical disease have been prematurely dismissed. This sequence allows for a logical inquiry into the understandable distress that has occurred following symptom onset. Self-report symptom measures may also provide helpful information and facilitate discussion between patients and health care providers.

Providing Diagnostic Feedback

When providing diagnostic feedback, above all else, it is crucial that patients know that the physician believes them. Communicate clearly to the patient that you believe the symptoms are real, as are the dysfunction and distress they are causing. Avoid psychogenic implications such as, "there is nothing wrong" that the patient could misinterpret. However, it is important to provide a clear message that no serious disease has been found. The dynamic interactions involving stress, mood state, and functional illness explained by the biopsychosocial model can also be useful in providing a plausible alternative explanation for the symptoms. The physician can also provide information about prognosis based on typical experiences with the

symptom such as it usually goes away with time, it may come and go, or it may be persistent. However, in any case, ongoing care will be available through follow-up visits or referral for psychological treatment to learn self-management coping strategies. Sharpe (2020) has cautioned against making multiple medical specialist referrals for functional illnesses due to the potential for iatrogenic harms referenced earlier.

Treatment Plan

All patients should be given a treatment plan that includes a sense of ongoing support and follow-up be it with general practitioner, medical specialist, or psychologist. Many patients also respond well to advice on knowing when to be concerned about their symptoms (e.g., if symptoms get worse, additional symptoms present) and when not to be. Henningsen et al. [9] have suggested a stepped care plan based on the number of physical and psychological symptoms present and the severity of the symptoms. For example, patients with mild symptoms may respond to reassurance and are encouraged to maintain a healthy lifestyle.

Those with moderate symptoms may benefit from an additional discussion on coping resources (i.e., self-help organizations, and self-care), advice on complementary medicine and allied health providers, setting realistic goals, and consideration for anti-depressant medication, particularly for comorbid anxiety or depressive symptoms, or pain. They also may be amenable to suggestions to try relaxation training or mindfulness mediation from a reliable trainer.

For individuals with more severe symptoms, in addition to the above considerations for those with moderate symptoms, one should evaluate the current state of past traumas and any maintaining factors such as tumultuous living arrangements, current litigation issues, concerning medication use patterns, and consider more strongly the need for a referral to a psychologist or other mental health practitioner, or referral to multi-disciplinary service, if available. Patients should continue to receive physical assessments at regular intervals for persisting symptoms at follow-up visits. Some practitioners may prefer to schedule follow-up office visits at regular intervals (i.e., 4–6 weeks) rather than having patients schedule as needed. At follow-ups, physicians should reinforce education on the functional nature of symptoms, changes in symptoms that would be concerning, and additional professionals who may be able to provide treatment if needed (i.e., physiotherapy, occupational therapy, psychology, etc.).

Making Referrals

When considering referral for psychological treatment, it is important to know what services are available and what types of referrals will be accepted (e.g., a treatment service that offers brief CBT will not likely accept a patient who requires long-term therapy for a personality disorder) prior to making a referral. Another important consideration is making sure the patient understands why they are being referred. It

should be clearly communicated that you are not making the referral because you believe the illness is a figment of the patient's imagination or "all in their head." Sharpe [119] has suggested using statements to encourage a referral such as "having physical symptoms can make anxiety and depression worse and turn into a vicious circle. I wonder if treating the anxiety/depression (or learning relaxation skills) may also be helpful. In my experience it has been". It is also prudent to indicate that the psychological treatment has empirical evidence to support its use and therefore has a reasonable chance of helping. When possible, explain what they may expect in therapy and that you are not "passing them off" to mental health, but will continue to follow them [119]. Attending to these considerations should maximize the likelihood that they will attend the initial appointment with the psychologist. Co-locating psychological services in primary care offices or specialty clinics can help normalize psychological treatment in FSS.

Summary

The development of FSS is a complex process of precipitating, perpetuating, and predisposing biopsychosocial factors. A psychological assessment aims at understanding these factors, past and present, in a patient's life. A number of evidence-based psychological treatments exist that can reduce symptoms, symptom distress, and associated loss of function. Health care providers are instrumental in explaining the complex role psychological factors may play in symptom development and encouraging participation in treatment.

References

1. Melzack R, Wall PD. Pain mechanisms: a new theory. Science. 1965;150:971–9. https://doi.org/10.1126/science.150.3699.971.
2. Melzack R, Casey KL. Sensory, motivational and central control determinants of pain: a new conceptual model. In: Kenshalo D, editor. The skin senses. Springfield, IL: Charles C Thomas; 1968. p. 423–43.
3. Melzack R. Pain and the neuromatrix in the brain. J Dent Educ. 2001;65:1378–82.
4. Engel GL. The need for a new medical model: a challenge for biomedical science. Science. 1977;196:129–36.
5. Kellner R. Functional somatic symptoms and hypochondriasis. Arch Gen Psychiatry. 1985;42:821–33.
6. Kellner R. Hypochondriasis and somatization. JAMA. 1987;258:2718–22.
7. Kellner R. Psychosomatic syndromes, somatization and somatoform disorders. Psychother Psychosom. 1994;61:4–24.
8. Barsky AJ, Borus JF. Functional somatic syndromes. Ann Intern Med. 1999;130:910–21.
9. Henningsen P, Zipfel S, Sattel H, Creed F. Management of functional somatic syndromes and bodily distress. Psychother Psychosom. 2018;87:12–31. https://doi.org/10.1159/0004844413.
10. Kleykamp BA, Ferguson MC, McNicol E, Bixho I, Arnold LM, Edwards RR, et al. The prevalence of psychiatric and chronic pain comorbidities in fibromyalgia: an ACTTION systematic review. Semin Arthritis Rheu. 2021;51:166–74. https://doi.org/10.1016/j.semarthrit.2020.10.006.

11. Carta MG, Moro MF, Pinna FL, Testa G, Cacace E, Ruggiero V, et al. The impact of fibromyalgia syndrome and the role of comorbidity with mood and post-traumatic stress disorder in worsening the quality of life. Int J Soc Psychiatry. 2018;64:647–55.
12. Janssens KAM, Zijlema WL, Joustra ML, Rosmalen JGM. Mood and anxiety disorders in chronic fatigue syndrome, fibromyalgia and irritable bowel syndrome: results from the LifeLines cohort study. Psychosom Med. 2015;77:449–57.
13. Deary V, Chalder T, Sharpe M. The cognitive behavioural model of medically unexplained symptoms: a theoretical and empirical review. Clin Psychol Rev. 2007;27:781–97. https://doi.org/10.1016/j.cpr.2007.07.002.
14. Sharpe M, Peveler R, Mayou R. The psychological treatment of patients with functional somatic symptoms: a practical guide. J Psychosom Res. 1992;36:515–29.
15. Van den Bergh O, Witthoft M, Petersen S, Brown R. Symptoms and the body: taking the inferential leap. Neurosci Biobehav Rev. 2017;74:185–203.
16. Kube T, Rozenkrantz L, Rief W, Barsky A. Understanding persistent physical symptoms: conceptual integration or psychological expectation models and predictive processing accounts. Clin Psychol Rev. 2020;76:101829.
17. Khazan IZ. The clinical handbook of biofeedback: a step-by-step guide for training and practice with mindfulness. Singapore: Wiley-Blackwell; 2013.
18. Woolfolk RL, Allen LA. Treating somatization: a cognitive-behavioral approach. New York: Guilford Press; 2007.
19. Pilowsky I. Dimensions of hypochondriasis. Br J Psychiatry. 1967;113:89–93.
20. Kellner R, Abbott P, Winslow WW, Pathak D. Fears, beliefs, and attitudes in dsm-iii hypochondriasis. J Nerv Ment Dis. 1987;175:20–5.
21. Salkovskis PM, Rimes KA, Warwick HM, Clark DM. The health anxiety inventory: development and validation of scales for the measurement of health anxiety and hypochondriasis. Psychol Med. 2002;32:843–53.
22. Hedman E, Lekander M, Ljótsson B, Lindefors N, Rück C, Andersson G, Andersson E. Optimal cut-off points on the health anxiety inventory, illness attitude scales and whiteley index to identify severe health anxiety. PLoS One. 2015;10(4):e0123412.
23. Reiss S, Peterson RA, Gursky DM, McNally RJ. Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. Behav Res Ther. 1986;24(1):1–8. https://doi.org/10.1016/0005-7967(86)90143-9.
24. Sullivan MJL, Bishop S, Pivik J. The pain catastrophizing scale: development and validation. Psychol Assess. 1995;7:524–32.
25. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Washington, DC: Author; 2013.
26. Gureje O, Reed GM. Bodily distress disorder in ICD-11: problems and prospects. World Psychiatry. 2016;15:291–2.
27. Goldberg DP, Reed GM, Robles R, Bobes J, Iglesias C, Fortes S, et al. Multiple somatic symptoms in primary care: a field study for ICD-11 PHC, WHO's revised classification of mental disorders in primary care setting. J Psychosom Res. 2016;91:48–54.
28. Koelen JA, Houtveen JH, Abbass A, Luyten P, Eurelings-Bontekoe EH, Van Broeckhuysen-Kloth SA, Bühring ME, Geenen R. Effectiveness of psychotherapy for severe somatoform disorder: meta-analysis. Br J Psychiatry. 2014;204:12–9.
29. Menon V, Rajan TM, Kuppili PP, Sarkar S. Cognitive behavior therapy for medically unexplained symptoms: a systematic review and meta-analysis of published controlled trials. Indian J Psychol Med. 2017;39:399–406.
30. van Dessel N, den Boeft M, van der Wouden JC, Kleinstäuber M, Leone SS, Terluin B, Numans ME, van der Horst HE, van Marwijk H. Non-pharmacological interventions for somatoform disorders and medically unexplained physical symptoms (MUPS) in adults. Cochrane Database Syst Rev. 2014;11:CD011142.
31. Bernardy K, Füber N, Köllner V, Häuser W. Efficacy of cognitive-behavioral therapies in fibromyalgia syndrome—a systematic review and metaanalysis of randomized controlled trials. J Rheumatol. 2010;37:1991–2005.

32. Bernardy K, Klose P, Busch AJ, Choy EH, Häuser W. Cognitive behavioural therapies for fibromyalgia. Cochrane Database Syst Rev. 2013;9:CD009796.
33. Glombiewski JA, Sawyer AT, Gutermann J, Koenig K, Rief W, Hofmann SG. Psychological treatments for fibromyalgia: a metaanalysis. Pain. 2010;151:280–95.
34. Malouff JM, Thorsteinsson EB, Rooke SE, Bhullar N, Schutte NS. Efficacy of cognitive behavioral therapy for chronic fatigue syndrome: a meta-analysis. Clin Psychol Rev. 2008;28:736–45.
35. Marques MM, De Gucht V, Gouveia MJ, Leal I, Maes S. Differential effects of behavioral interventions with a graded physical activity component in patients suffering from chronic fatigue (syndrome): an updated systematic review and meta-analysis. Clin Psychol Rev. 2015;40:123–37.
36. Price JR, Mitchell E, Tidy E, Hunot V. Cognitive behaviour therapy for chronic fatigue syndrome in adults. Cochrane Database Syst Rev. 2008;3:CD001027.
37. Altayar O, Sharma V, Prokop LJ, Sood A, Murad MH. Psychological therapies in patients with irritable bowel syndrome: a systematic review and meta-analysis of randomized controlled trials. Gastroenterol Res Pract. 2015;2015:549308.
38. Laird KT, Tanner-Smith EE, Russell AC, Hollon SD, Walker LS. Comparative efficacy of psychological therapies for improving mental health and daily functioning in irritable. bowel syndrome: a systematic review and meta-analysis. Clin Psychol Rev. 2017;51:142–52.
39. Li L, Xiong L, Zhang S, Yu Q, Chen M. Cognitive-behavioral therapy for irritable bowel syndrome: a meta-analysis. J Psychosom Res. 2014;77:1–12.
40. Zijdenbos IL, de Wit NJ, van der Heijden GJ, Rubin G, Quartero AO. Psychological treatments for the management of irritable bowel syndrome. Cochrane Database Syst Rev. 2009;1:CD006442.
41. Kisely S, Forbes M, Sawyer E, Black E, Lalloo R. A systematic review of randomized trials for the treatment of burning mouth syndrome. J Psychosom Res. 2016;86:39–46.
42. Kisely SR, Campbell LA, Yelland MJ. Paydar A: psychological interventions for symptomatic management of non-specific chest pain in patients with normal coronary anatomy. Cochrane Database Syst Rev. 2015;6:CD004101.
43. Schmid G, Henningsen P, Dieterich M, Sattel H, Lahmann C. Psychotherapy in dizziness: a systematic review. J Neurol Neurosurg Psychiatry. 2011;82:601–6.
44. Cima RFF, Andersson G, Schmidt CJ, Henry JA. Cognitive-behavioral treatments for tinnitus: a review of the literature. J Am Acad Audiol. 2014;25:29–61.
45. Hesser H, Weise C, Westin VZ, Andersson G. A systematic review and meta-analysis of randomized controlled trials of cognitive behavioral therapy for tinnitus distress. Clin Psychol Rev. 2011;31:545–53.
46. Martinez-Devesa P, Perera R, Theodoulou M, Waddell A. Cognitive behavioural therapy for tinnitus. Cochrane Database Syst Rev. 2010;9:CD005233.
47. Hayes SC, Barnes-Holmes D, Roche B, editors. Relational frame theory: a post-Skinnerian account of human language and cognition. New York: Kluwer Academic/Plenum; 2001.
48. Hayes SC, Strosahl KD, Wilson KG. Acceptance and commitment therapy: an experiential approach to behavior change. 2nd ed. New York: Guilford Press; 2012.
49. Hughes LS, Clark J, Colclough JA, Dale E, McMillan D. Acceptance and commitment therapy (ACT) for chronic pain: a systematic review and meta-analyses. Clin J Pain. 2017;33:552–68.
50. Veehof MM, Trompetter HR, Bohlmeijer ET, Schreurs KMG. Acceptance- and mindfulness-based interventions for the treatment of chronic pain: a meta-analytic review. Cogn Behav Ther. 2016;45:5–31. https://doi.org/10.1080/16506073.2015.1098724.
51. Eilenberg T, Fink P, Jensen J, Rief W, Frostholm L. Acceptance and commitment group therapy (ACT-G) for health anxiety: a randomized controlled trial. Psychol Med. 2016;46:103–15.
52. Hoffmann D, Rask CU, Hedman-Lagerlöf E, Jensen JS, Frostholm L. Efficacy of internet-delivered acceptance and commitment therapy for severe health anxiety: results from a randomized, controlled trial. Psychol Med. 2020;51:1–11. https://doi.org/10.1017/S0033291720001312.

53. Maria Kleinstäuber M, Allwang C, Bailer J, Berking M, Brünahl C, Erkic M, et al. Cognitive behaviour therapy complemented with emotion regulation training for patients with persistent physical symptoms: a randomised clinical trial. Psychother Psychosom. 2019;88:287–99.
54. Pedersen HF, Agger JL, Frostholm L, Jensen JS, Ørnbøl E, Fink P, Schröder A. Acceptance and Commitment group Therapy for patients with multiple functional somatic syndromes: a three-armed trial comparing ACT in a brief and extended version with enhanced care. Psychol Med. 2019;2019(49):1005–14.
55. Ljótsson B, Falk L, Vesterlund AW, Hedman E, Lindfors P, Ruck C, et al. Internet-delivered exposure and mindfulness based therapy for irritable bowel syndrome—a randomized controlled trial. Behav Res Ther. 2010;48:531–9. https://doi.org/10.1016/j.brat.2010.03.003.
56. Ljótsson B, Hedman E, Andersson E, Hesser H, Lindfors P, Hursti T, et al. Internet-delivered exposure-based treatment vs. stress management for irritable bowel syndrome: a randomized trial. The Amer. J Gastroenterol. 2011;106:1481–91. https://doi.org/10.1038/ajg.2011.139.
57. Ljótsson B, Hesser H, Andersson E, Lackner JM, El Alaoui S, Falk L, et al. Provoking symptoms to relieve symptoms: a randomized controlled dismantling study of exposure therapy in irritable bowel syndrome. Behav Res Ther. 2014;55:27–39. https://doi.org/10.1016/j.brat.2014.01.007.
58. Westin V, Schulin M, Hesser H, Karlsson M, Noe R, Olofsson U, et al. Acceptance and Commitment Therapy versus Tinnitus Retraining Therapy in the treatment of tinnitus: a randomised controlled trial. Behav Res Ther. 2011;49:737–47.
59. Hesser H, Gustafsson T, Lunden C, Henrikson O, Fattahi K, Johnsson E, et al. A randomized controlled trial of internet-delivered cognitive behavior therapy and acceptance and commitment therapy in the treatment of tinnitus. J Consult Clin Psychol. 2012;80:649–61.
60. Dindo L, Van Liew JR, Arch JJ. Acceptance and commitment therapy: a transdiagnostic behavioral intervention for mental health and medical conditions. Neurotherapeutics. 2017;14:546–53.
61. Gregg JA, Callaghan GM, Hayes SC, Glenn-Lawson JL. Improving diabetes self-management through acceptance, mindfulness, and values: a randomized controlled trial. J Consult Clin Psychol. 2007;75:336–43.
62. Sheppard SC, Forsyth JP, Hickling EJ, Bianchi J. A novel application of Acceptance and Commitment Therapy for psychosocial problems associated with multiple sclerosis. Int J MS Care. 2010;12:200–6.
63. Dindo L, Recober A, Marchman JN, Turvey C, O'Hara M. One-day behavioral treatment for patients with comorbid depression and migraine: a pilot study. Behav Res Ther. 2012;50:537–43.
64. Dindo L, Recober A, Marchman JN, O'Hara M, Turvey C. One-day behavioral intervention for depressed migraine patients: effects on headache. Headache. 2014;54:528–38.
65. Huddleston C, Martin L, Woods K, Dindo L. One-day behavioral intervention for distressed veterans with migraine: results of a multimethod pilot study. Mil Med. 2018;183:e184–92.
66. Dindo L, Marchman J, Grindes H, Fiedorowicz JG. A brief behavioral intervention targeting mental health risk factors for vascular disease: a pilot study. Psychother Psychosom. 2015;84:183–5.
67. Dindo L, Zimmerman MB, Hadlandsmyth K, St. Marie B, Embree J, Marchman JN, Tripp-Reimer T, Rakel B. Acceptance and Commitment Therapy for the prevention of chronic postsurgical pain and opioid use in at-risk veterans: a pilot randomized controlled study. J Pain. 2018;19:1211–21.
68. Hadlandsmyth K, Dindo LN, Wajid R, Sugg SL, Zimmerman MB, Rakel BA. A single-session acceptance and commitment therapy intervention among women undergoing surgery for breast cancer: a randomized pilot trial to reduce persistent postsurgical pain. Psycho-Oncology. 2019;28:2210–7.
69. Hou JK, Vanga RR, Thakur E, Gonzalez I, Willis D, Dindo L. One-day behavioral intervention for patients with inflammatory bowel disease and co-occurring psychological distress. Clin Gastroenter Hepatol. 2017;15:1633–4.
70. Kabat-Zinn J. Mindfulness for beginners. Boulder: Sounds True; 2012.

71. Segal Z, Williams M, Teasdale J. Mindfulness-based cognitive therapy for depression. 2nd ed. New York: Guilford Press; 2013.
72. Van Ravesteijn H, Fjorback L. Mindfulness-based cognitive therapy: medically unexplained symptoms. In: Eisendrath SJ, editor. Mindfulness-based cognitive therapy: innovative applications. Cham: Springer; 2016. https://doi.org/10.1007/978-3-319-29866-5.
73. Conversano C, Orrù G, Pozza A, Miccoli M, Ciacchini R, Marchi L, Gemignani A. Is mindfulness-based stress reduction effective for people with hypertension? A systematic review and meta-analysis of 30 years of evidence. Int J Environ Res Public Health. 2021;18:2882. https://doi.org/10.3390/ijerph18062882.
74. Intarakamhang U, Macaskill A, Prasittichok P. Mindfulness interventions reduce blood pressure in patients with non-communicable diseases: a systematic review and meta-analysis. Heliyon. 2020;6:e03834. https://doi.org/10.1016/j.heliyon.2020.e03834.
75. Andrés-Rodríguez L, Borràs X, Feliu-Soler A, Pérez-Aranda A, Rozadilla-Sacanell A, Montero-Marin J, et al. Immune-inflammatory pathways and clinical changes in fibromyalgia patients treated with Mindfulness-Based Stress Reduction (MBSR): a randomized, controlled clinical trial. Brain Behav Immun. 2019;80:109–19. https://doi.org/10.1016/j.bbi.2019.02.030.
76. Pérez-Aranda A, Feliu-Soler A, Montero-Marín J, García-Campayo J, Andrés-Rodríguez L, Borràs X, et al. A randomized controlled efficacy trial of mindfulness-based stress reduction compared with an active control group and usual care for fibromyalgia: the EUDAIMON study. Pain. 2019;160:2508–23. https://doi.org/10.1097/j.pain.0000000000001655.
77. Frostholm L, Rask C. Third wave treatments for functional somatic syndromes and health anxiety across the age span: a narrative review. Clin Psychol Eur. 2019;1:e32217.
78. Billones R, Saligan L. What works in mindfulness interventions for medically unexplained symptoms? A systematic review. Asian Pac Isl Nurs J. 2020;5:1–11. https://doi.org/10.31372/20200501.1082.
79. Grossman P, Tiefenthaler-Gilmer U, Raysz A, Kesper U. Mindfulness training as an intervention for fibromyalgia: evidence of postintervention and 3-year follow-up benefits in well-being. Psychother Psychosom. 2007;76:226–33. https://doi.org/10.1159/000101501.
80. Rimes KA, Wingrove J. Mindfulness-based cognitive therapy for people with chronic fatigue syndrome still experiencing excessive fatigue after cognitive behaviour therapy: a pilot randomized study. Clin Psychol Psychother. 2013;20:107–17. https://doi.org/10.1002/cpp.793.
81. McKenna L, Marks EM, Hallsworth CA, Schaette R. Mindfulness-based cognitive therapy as a treatment for chronic tinnitus: a randomized controlled trial. Psychother Psychosom. 2017;86:351–61.
82. McKenna L, Marks EM, Vogt F. Mindfulness-based cognitive therapy for chronic tinnitus: evaluation of benefits in a large sample of patients attending a tinnitus clinic. Ear Hear. 2018;39:359–66.
83. Philippot P, Nef F, Clauw L, de Romrée M, Segal Z. A randomized controlled trial of mindfulness-based cognitive therapy for treating tinnitus. Clin Psychol Psychother. 2012;19:411–9.
84. McManus F, Surawy C, Muse K, Vazquez-Montes M, Williams JM. A randomized clinical trial of mindfulness-based cognitive therapy versus unrestricted services for health anxiety (hypochondriasis). J Consult Clin Psychol. 2012;80:817–28.
85. Gooding H, Stedmon J, Crix D. 'All these things don't take the pain away but they do help you to accept it': making the case for compassion-focused therapy in the management of persistent pain. Br J Pain. 2020;14:31–41. https://doi.org/10.1177/2049463719857099.
86. American Psychological Association. Hypnosis [Internet]. American Psychological Association; [cited 2021 Jun 24]. Available from https://www.apa.org/topics/hypnosis
87. Jensen MP. Hypnosis for chronic pain management: therapist guide. New York: Oxford University Press; 2011.
88. Flynn N. Systematic review of the effectiveness of hypnosis for the for the management of headache. Int J Clin Exp Hyp. 2018;66:343–52. https://doi.org/10.1080/00207144.2018.1494432.

89. Maudoux A, Bonnet S, Lhonneux-Ledoux F, Lefebvre P. Ericksonian hypnosis in tinnitus therapy. B-ENT. 2007;3(Suppl 7):75–7.
90. Lee HH, Choi YY, Choi MG. The efficacy of hypnotherapy in the treatment of irritable bowel syndrome: a systematic review and meta-analysis. J Neurogastroenterol Motil. 2014;20:152–62.
91. Schaefert R, Klose P, Moser G, Häuser W. Efficacy, tolerability, and safety of hypnosis in adult irritable bowel syndrome: systematic review and meta-analysis. Psychosom Med. 2014;76:389–98.
92. Webb AN, Kukuruzovic RH, Catto-Smith AG, Sawyer SM. Hypnotherapy for treatment of irritable bowel syndrome. Cochrane Database Syst Rev. 2007;4:CD005110.
93. Bernardy K, Füber N, Klose P, Häuser W. Efficacy of hypnosis/guided imagery in fibromyalgia syndrome—a systematic review and meta-analysis of controlled trials. BMC Musculoskelet Disord. 2011;12:133.
94. Zech N, Hansen E, Bernardy K, Häuser W. Efficacy, acceptability and safety of guided imagery/hypnosis in fibromyalgia—a systematic review and meta-analysis of randomized controlled trials. Eur J Pain. 2017;21:217–27.
95. Masters KS. Recurrent abdominal pain, medical intervention, and biofeedback: what happened to the biopsychosocial model? Appl Psychophysiol Biofeedback. 2006;31(2):155–65. https://doi.org/10.1007/s10484-006-9016-4.
96. Schwartz MS, Andrasik F, editors. Biofeedback. 4th ed. New York: Guilford Press; 2016.
97. Flor H, Schwartz MS. Tinnitus: nothing is as loud as a sound you are trying not to hear. In: Schwartz MS, Andrasik F, editors. Biofeedback. 3rd ed. New York: Guilford Press; 2003. p. 750–75.
98. Kutyana AM. Heart rate variability biofeedback for tinnitus: preliminary findings from multiple case studies. Biofeedback. 2015;43:142–8.
99. Rief W, Weise C, Kley N, Martin A. Psychophysiologic treatment of chronic tinnitus: a randomized clinical trial. Psychosom Med. 2005;67:833–8. https://doi.org/10.1097/01.psy.0000174174.38908.c6.
100. Weise C, Heinecke K, Rief W. Biofeedback-based behavioral treatment for chronic tinnitus: results of a randomized controlled trial. J Consult Clin Psych. 2008;76:1046–57. https://doi.org/10.1037/a0013811.
101. Glaros AG, Lausten L. Tempromandibular disorders. In: Schwartz MS, Andrasik F, editors. Biofeedback. 3rd ed. New York: Guilford Press; 2003. p. 349–68.
102. Schwartz MS, Andrasik F. Headache. In: Schwartz MS, Andrasik F, editors. Biofeedback. 3rd ed. New York, NY: Guilford Press; 2003. p. 275–348.
103. Schwartz MS, Thompson JM. Fibromyalgia syndrome. In: Schwartz MS, Andrasik F, editors. Biofeedback. 3rd ed. New York: Guilford Press; 2003. p. 776–94.
104. Aggarwal VR, Fu Y, Main CJ, Wu J. The effectiveness of self-management interventions in adults with chronic orofacial pain: a systematic review, meta-analysis and meta regression. Eur J Pain. 2019;23:849–65. https://doi.org/10.1002/ejp.1358.
105. Shapiro F. Eye movement desensitization and preprocessing: basic principles, protocols, and procedures. 2nd ed. New York: Guilford Press; 2001.
106. Luber M, editor. Eye movement desensitization and reprocessing (EMDR) therapy scripted protocols and summary sheets: treating trauma in somatic and medical-related conditions. New York: Springer; 2019.
107. Grant M, Threlfo C. EMDR in the treatment of chronic pain. J Clin Psychol. 2002 Dec;58(12):1505–20. https://doi.org/10.1002/jclp.10101.
108. Tefft AJ, Jordan IO. Eye movement desensitization reprocessing as treatment for chronic pain syndromes: a literature review. J Am Psychiatr Nurses Assoc. 2016;22:192–214. https://doi.org/10.1177/1078390316642519.
109. Tesarz J, Leisner S, Gerhardt A, Janke S, Seidler GH, Eich W, Hartmann M. Effects of eye movement desensitization and reprocessing (EMDR) treatment in chronic pain patients: a systematic review. Pain Med. 2014;15:247–63. https://doi.org/10.1111/pme.12303.

110. Marcus SV. Phase 1 of integrated EMDR: an abortive treatment for migraine headaches. J EMDR Pract Res. 2008;2:15–25.
111. Konuk E, Epozdemir H, Atceken SH, Aydin Y. EMDR treatment of migraine. J EMDR Pract Res. 2011;5:166–76.
112. Demirci OO, Sagaltici E, Yildirim A, Boysan M. Sleep Hypn. 2017;19:70–7. https://doi.org/10.5350/Sleep.Hypn.2017.19.0146.
113. Luyten T, van Rompaey V, van de Heyning P, van Looveran N, Jacquemin L, Cardon E, Declau F, et al. EMDR in the treatment of chronic subjective tinnitus: a systematic review. J EMDR Pract Res. 2020;14:135–49.
114. Luyten TR, Jacquemin L, Van Looveren N, Declau F, Fransen E, Cardon E, et al. Bimodal therapy for chronic subjective tinnitus: a randomized controlled trial of EMDR and TRT versus CBT and TRT. Front Psychol. 2020;10(11):2048. https://doi.org/10.3389/fpsyg.2020.02048.
115. Cope S. EMDR as an adjunctive psychological therapy for patients with functional neurological disorder: illustrative case examples. J EMDR Pract Res. 2020;14:76–89.
116. Page LA, Wessely S. Medically unexplained symptoms: exacerbating factors in the doctor-patient encounter. J R Soc Med. 2003;96:223–7. https://doi.org/10.1258/jrsm.96.5.223.
117. Stone J, Carson A, Duncan R, Coleman R, Roberts R, Warlow C, et al. Symptoms 'unexplained by organic disease' in 1144 new neurology outpatients: how often does the diagnosis change at follow-up? Brain. 2009;132:2878–88.
118. Sharpe M. Medically unexplained symptoms. In: Firth J, Conlon C, Cox T, editors. Oxford textbook of medicine. 6th ed. Oxford: Oxford University Press; 2020. p. 1–8. https://doi.org/10.1093/med/9780198746690.003.0623.
119. Sharpe M, Wessely S. Psychological treatments. In: Firth J, Conlon C, Cox T, editors. Oxford textbook of medicine. 6th ed. Oxford: Oxford University Press; 2020. p. 1–10. https://doi.org/10.1093/med/9780198746690.003.0626.