A Review of Transdiagnostic Mechanisms in Cognitive Behavior Therapy

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KEYWORDS

• Transdiagnostic • Mechanism • Cognitive behavior therapy • Skills • Alliance

KEY POINTS

- Transdiagnostic cognitive behavior therapies (CBTs) include CBT-specific skills, transtheoretical mechanisms, and psychopathological mechanisms.
- CBT-specific skills, such as cognitive restructuring or opposite-to-emotion action, may directly promote symptom reduction.
- Transtheoretical mechanisms, such as the alliance or treatment expectancies, may facilitate the efficacy of CBT-specific skills.
- Change in psychopathological mechanisms (eg, aversive reactivity, positive affectivity) may indicate subsequent symptom change.

A REVIEW OF TRANSDIAGNOSTIC MECHANISMS IN COGNITIVE BEHAVIOR THERAPY

Cognitive behavior therapy (CBT) is a psychological treatment in which patients are taught skills to regulate their emotions and more effectively manage their symptoms.[1] Relative to other forms of psychotherapy, CBT is brief, structured, and present-focused.[1] The cognitive behavioral approach is transdiagnostic,[2] having demonstrated efficacy in reducing symptoms for a wide range of psychiatric disorders.[3–5] It is important to note, however, that a substantial portion of patients (38%–65%) do not achieve full remission by the end of treatment.[3–5] To improve outcomes in CBT, it is important to identify active mechanisms of change during treatment[6] to ensure that CBTs engage these processes.

At least 3 classes of mechanisms outlined by Sauer-Zavala and colleagues[2] are relevant for psychological treatment (cf, Ref.[7] for other putative mechanisms). These

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classes can be characterized as treatment-specific therapeutic mechanisms thought to exert a direct impact on symptom change in specific CBTs, transtheoretical mechanisms thought to exert a broad impact on symptom change regardless of the treatment, and psychological mechanisms, thought to reflect changes in core psychological functioning signaling likely subsequent symptom changes. First, therapeutic mechanisms refer to the acquisition of competencies specific to a particular therapeutic approach; in skill-focused treatments such as CBT, the degree to which patients engage with the emotion regulation strategies taught may be an important driver of change.[8] Next, transtheoretical mechanisms (eg, working alliance, treatment expectancies) may facilitate improvement during all forms of psychotherapy, including CBT. Finally, psychopathological mechanisms refer to maladaptive, disorder-related processes that maintain symptoms (eg, experiential avoidance, negative affectivity); reductions in these processes may be necessary to observe symptom improvement. In this article, we review the evidence supporting these 3 classes of putative CBT mechanisms. We then discuss how these mechanisms may impact one another and provide recommendations for future psychotherapy treatment researchers to test these hypotheses.

Cognitive Behavior Therapy-specific Therapeutic Mechanisms

CBTs are designed to teach patients certain cognitive, behavioral, or mindfulness skills to more effectively manage their symptoms and promote more adaptive functioning. Cognitive skills involve identifying overly negative thoughts about oneself, other people, or the world and seeking out evidence to develop more balanced or realistic thoughts. Behavioral skills involve activities designed to provide new learning by challenging maladaptive urges to avoid emotions, people, or experiences that are less dangerous than one fears. Mindfulness and acceptance skills involve structured and experiential practices to cultivate nonjudgmental present-moment awareness of oneself and one's experiences. Other skills often taught in CBT but which do not fall cleanly into these categories include problem-solving, distraction, and social support. However, the cognitive, behavioral, and mindfulness skills used to manage daily stressors may be more impactful for a broader range of outcomes than these more specialized skills.[9]

In large-scale meta-analyses, some skills have demonstrated greater efficacy for certain outcomes than others. For instance, interoceptive exposure was associated with the largest improvements in panic disorder,[10] and behavioral activation was associated with the largest improvements in depression in Internet-delivered CBT[11] but not in-person CBT.[12] However, the fact that relatively few skills emerged as unique predictors of improvement for specific problems suggests that CBT skills may exert similarly sized effects on average across outcomes. Given that patients tend to use a wide range of skills in their daily lives,[13] the specific skills used may be less important to symptom changes than the order in which these skills are learned and specific aspects of how those skills are used.

Many CBTs are designed to teach patients skills in a prespecified order. However, patients typically present with a range of symptoms that may respond better to personalized sequences of skills. Researchers have begun to compare sequences of skills designed to capitalize on patients' pretreatment strengths to sequences designed to compensate for patients' pretreatment deficits. In general, sequences that capitalize on patients' strengths have demonstrated greater efficacy across a range of outcomes than those designed to compensate for patients' deficits ($g = .17$).[14] Recently, more comprehensive approaches to treatment personalization, such as process-based therapy (PBT), that advocate for idiographic tailoring in case conceptualization

and progress tracking in addition to treatment selection and ordering[15] have begun to gain traction, though more research is necessary to determine the efficacy of doing so.

Southward and colleagues[16] developed a translational framework to delineate several potential aspects of skill use, including self-efficacy in using skills, the number of skills in patients' repertoires, how frequently patients use skills, and how well they use skills. Improvements in therapy skill self-efficacy have been associated with more frequent skill use,[17] predicted session-to-session reductions in panic symptoms,[18] and mediated the effect of CBT compared to waitlist on reductions in social anxiety.[19] Patients' skill repertoires may increase relatively linearly over treatment and those with larger repertoires tend to report fewer symptoms of anxiety and depression.[13] However, larger repertoires on a given day were associated with higher anxiety and lower depression among patients in a dialectical behavior therapy (DBT) skills group,[13] but predicted unique reductions in loneliness in the Unified Protocol (UP)[20] providing mixed evidence of the efficacy of skill repertoires as an active mechanism of treatment. By contrast, using therapy skills more frequently has predicted improvements in anxiety,[21,22] depression,[20–25] emotion dysregulation,[26] and distress tolerance[26] and mediated the effect of treatment on suicide attempts, nonsuicidal self-injury behaviors, anger expression, and depression.[27] Finally, higher quality skill use predicted decreases in depression across in-person[28] and Internet-delivered[29] cognitive therapy for depression. Self-reported skill quality also demonstrated the highest loading on a composite measure of skillfulness, and within-person changes in this composite measure predicted session-to-session reductions in anxiety and depression in the UP.[21]

Together, these results suggest that, beyond which skills patients use, beliefs in their abilities to use their skills, as well as the frequency and quality with which they use them may lead to the strongest and most consistent impact on a range of internalizing symptoms, whereas larger repertoires of skills may be less impactful on these outcomes. By also ordering the skills taught in treatment according to patients' pretreatment strengths, researchers may be able to further optimize the delivery of CBT for a range of conditions.

TRANSTHEORETICAL MECHANISMS

Working Alliance

One of the most well-studied transtheoretical mechanisms is the working alliance, defined as the collaborative relationship between patients and therapists.[30] Three distinct but related components are theorized to contribute to this relationship: agreement on the goals of the treatment; agreement on the specific tasks used to achieve these goals; and an emotional bond consisting of mutual respect and liking.[31] Patients who report a stronger alliance with their therapists tend to also report better treatment outcomes across a range of psychotherapies than patients who report a weaker alliance.[30]

Researchers have also observed within-person effects, which characterize how the strength of a patient's working alliance deviates from their personal average at any given session. Meta-analytically, within-person improvements in working alliance predicted subsequent session-to-session improvements in internalizing symptoms (eg, anxiety, depression, post-traumatic stress, and eating disorder symptoms; $\beta = -.07$).[32] These results held even when adjusting for concurrent treatment processes (eg, therapist compliance, homework compliance) and patient characteristics (eg, demographics, symptom severity), highlighting the robustness of the alliance-outcome association.[32]

In CBT, a positive alliance is often viewed as the context within which other techniques and skills can be most effectively used.[33] For example, within-person increases in the frequency of skill use mediated the effects of within-person increases in alliance on session-to-session reductions in depression among adolescents with depression receiving CBT.[34] Though limited, these results provide burgeoning empirical support for a facilitative effect of working alliance and skillfulness in producing session-to-session symptom change.

Treatment Expectancies

Similar to the alliance, expectations for treatment can influence patients' engagement in and success with therapy. Expectations demonstrated a small-to-medium-sized meta-analytic association with posttreatment outcomes ($r = 0.18$).[35] Treatment credibility, or patients' perception of how suitable a treatment seems, has similarly been associated with treatment outcomes, with small-to-moderate effect sizes (ηs: −0.18–−0.25).[36] Although there is some debate over whether expectations and credibility represent the same process, patients often form expectations prior to gaining any significant information regarding the treatment.[37] Thus, although conceptually similar, expectations and credibility are considered distinct constructs that both contribute to successful treatment.[38]

Self-efficacy

Patient factors have also been considered as possible mechanisms by which change in therapy occurs. Self-efficacy is conceptualized as patients' beliefs that they can successfully execute behaviors necessary to produce change.[39] If patients believe that they can effectively use CBT skills in their daily lives, they are more likely to try to do so. Self-efficacy beliefs have been proposed to be a transdiagnostic mechanism of change and play a role in the development of anxiety.[40] Indeed, in CBT for social anxiety disorder, improvements in self-efficacy mediated the effect of CBT on social anxiety symptoms and were associated with lower social anxiety symptoms at 1 year follow-up.[19] In CBT for panic disorder, increases in self-efficacy were found to temporally precede changes in panic symptoms, indicating that changes in self-efficacy influence subsequent symptom changes.[18] Taken together, these results suggest that increased self-efficacy may serve as a mechanism by which symptom change occurs in CBT.

Overall, each of these transtheoretical mechanisms may contribute to change, regardless of the psychotherapy administered. Of course, all of these mechanisms likely contribute to successful therapy, and the extent to which each mechanism facilitates change varies from patient to patient.[41] Still, continued investigation into general mechanisms of change is necessary, as more clarity in this area will help researchers and clinicians improve the efficacy of psychotherapy.

PSYCHOPATHOLOGICAL MECHANISMS

CBT may be most efficacious for internalizing disorders such as anxiety, depressive, eating, and related disorders.[7] Thus, in the following section, we review psychopathological processes thought to maintain internalizing disorders, along with the evidence that CBTs engage these targets.

Aversive Reactivity

Aversive reactivity denotes the perception of negative emotions as uncontrollable, intolerable, dangerous, or unacceptable.[42] This broad construct has been referred to as anxiety sensitivity, experiential avoidance, intolerance of uncertainty, negative urgency,

and distress intolerance,[43] though these processes may all represent a unified factor.[44] Barlow and colleagues[45,46] describe aversive reactivity as a functional mechanism implicated in the development and maintenance of internalizing disorders. When negative emotional experiences, common in people with internalizing psychopathology, are met with aversive reactions, patients are more likely to engage in avoidant coping behaviors (ie, attempts to dampen, control, or escape negative emotions). Though emotional avoidance may provide momentary relief from negative affect, these behaviors exacerbate negative affect in the long term; this creates a positive feedback loop leading to the development and/or worsening of emotional disorder symptoms.[47]

There is burgeoning evidence that aversive reactivity is a putative mechanism of change in treatments for internalizing disorders. Reductions in aversive reactivity accounted for improvements in internalizing symptoms and were associated with increases in well-being in the UP.[44,48,49] Decreases in aversive reactivity also preceded and predicted improvements in emotional disorder symptoms among patients receiving a range of CBT protocols, and a number of specific CBT strategies (eg, mindfulness training, cognitive restructuring, exposures) are associated with improvements in aversive reactivity.[50,51]

Together, the literature on aversive reactivity suggests that how one relates to negative emotions is an important predictor of psychological health, even beyond the experience of negative emotions alone.[49] Moreover, preliminary evidence suggests that CBT protocols, as well as specific strategies drawn from CBT, may address aversive reactivity. However, most researchers have only investigated specific forms of aversive reactivity. We encourage future researchers to develop and validate a comprehensive measure of this construct that can be used across diagnoses and treatment protocols to more directly test its mechanistic effects during CBT.

Positive Affectivity

Existing treatments for emotional disorders have primarily focused on reducing or improving how people cope with negative affect, rather than enhancing positive affect. High positive affect is associated with greater well-being, physical health, and resilience,[52] whereas low positive affect has been implicated in the onset and maintenance of a range of emotional disorders.[53]

Improvements in positive affect have mediated improvements in depression and predicted changes in social anxiety over the course of mindfulness-based cognitive therapy (MBCT)[54] suggesting that changes in positive affect may be a mechanism of MBCT.[55] Several positive psychology interventions that are similar to CBT approaches (eg, savoring, cultivating and expressing gratitude, engaging in acts of kindness, and pursuit of hope and meaning in life) have improved well-being and reduced depressive symptoms,[56] although it remains unclear whether these interventions improve positive affect.[57] Recently, 2 novel CBTs developed to target anhedonia by enhancing positive affect, behavioral activation for the treatment of anhedonia[58] and positive affect treatment,[59] have improved positive affect and reduced anxiety, depression, and suicidal ideation.[58,60,61]

By contrast, bipolar disorder is marked by abnormally persistent positive or elevated moods during periods of mania.[62] Some have argued that excess positive affect in bipolar disorder is best addressed using medication,[63] perhaps contributing to the limited number of behavioral interventions focused on the downregulation of positive affectivity. GOALS, a therapeutic intervention centered on preventing manic episodes by reducing the setting and pursuit of overly ambitious goals is one exception, though additional research is necessary to confirm its efficacy.[64] In addition, interpersonal and social rhythm therapy, which aims to stabilize positive affect by tracking one's

emotions and activities which alter mood (eg, sleep, interpersonal factors), has demonstrated efficacy in extending periods between manic episodes.[65]

In sum, there is some evidence of positive affectivity as a transdiagnostic mechanism of CBT, and results of early trials testing novel comprehensive positive affect interventions have demonstrated meaningful reductions in emotional disorder symptoms. We encourage future researchers to test whether changes in positive affectivity predict subsequent symptom changes in these therapies to enhance these initial findings. Incorporating positive affect as a treatment target into existing CBT protocols may augment their efficacy by simultaneously downregulating negative affect and upregulating positive affect.

Attachment Style

In attachment theory, the responsiveness of caregivers, friends, and colleagues is thought to shape our interpersonal behaviors, cognitions, and emotions.[66,67] Insecure attachment styles (ie, ambivalent, avoidant, disorganized) are thought to result from close others who are inconsistent or unavailable in responding to a person's needs.[68] People with insecure attachment styles may feel vulnerable in relationships, which can manifest as excessive fear of rejection and panic when confronted with the possibility of abandonment or, conversely, as an antagonistic disposition and exaggerated distrust toward others.[69] Insecure attachment styles are over-represented among those with emotional disorders, highlighting its transdiagnostic relevancy.[69–71]

Evidence-based treatments targeting attachment insecurity include interpersonal psychotherapy[72] and attachment-based family therapy.[73] Reductions in attachment anxiety and avoidance during these treatments have been associated with reductions in depression, though it remains unclear whether there is a causal relation between these two constructs. Borderline personality disorder (BPD) Compass, a personality-based CBT for BPD, is designed to engage attachment insecurity as a functional mechanism linking temperamental antagonism to externalizing symptoms.[74,75] BPD Compass includes evidence-based methods to improve attachment insecurity, such as coaching patients to consider others' perspective and modifying negative beliefs about others' trustworthiness, with the goal of reducing antagonism.

Other cognitive behavioral interventions do not explicitly target insecure attachment in name, though some may indirectly address it. DBT,[76] for instance, includes assertiveness training which teaches skills for expressing one's needs in a confident and polite manner. Schema-focused therapy[77] challenges maladaptive patterns of thinking and feeling (ie, schemas) about relationships using cognitive therapy techniques. Both treatments have improved interpersonal functioning among patients with BPD.[78,79] Although CBT researchers have not often studied attachment insecurity as a mechanism of change, evidence of its transdiagnostic relevance, malleability in treatment, and associations with symptom reduction warrant further inquiry.

SUMMARY AND FUTURE DIRECTIONS

Engaging mechanisms responsible for change during CBT is important for increasing the potency and efficiency of our interventions. By ensuring that all strategies included in CBTs improve putative therapeutic, transtheoretical, and/or psychopathological mechanisms, treatment developers may be able to distill their interventions down to only active ingredients. In this article, we reviewed the roles that (1) CBT-specific skill competencies (therapeutic mechanisms), (2) general treatment factors (transtheoretical mechanisms), and (3) disorder-related processes that maintain symptoms (psychopathological mechanisms) play in enacting symptom improvement during CBT.

In general, there is good support for the association between most of the proposed putative mechanisms for CBT and psychological symptoms. Specifically, deficits in CBT skills (eg, low levels of mindfulness), psychopathological processes (eg, high levels of aversive reactivity), and common factors (eg, a limited bond with one's therapists) are transdiagnostically associated with a range of mental health conditions. There is also strong support that CBT-specific skill competencies, such as cognitive flexibility, behavior change, and mindfulness, improve during cognitive behavioral interventions. Although relatively fewer researchers have examined changes in transtheoretical processes, there is emerging evidence that these processes, particularly the alliance, also fluctuate and improve during CBT. The degree of support for putative psychopathological mechanisms improving throughout treatment is variable, with some processes (eg, aversive reactivity, positive affectivity) demonstrating change across multiple studies, and others (eg, attachment security) having been tested in relatively fewer trials.

Demonstrating that a construct is associated with psychopathology and improves during treatment is a preliminary step in identifying putative mechanisms, but more evidence is needed to determine whether improvement in a particular construct is driving any observed symptom change.[6] Only recently have researchers been collecting data on putative mechanisms and outcomes with enough frequency to draw conclusions about temporal precedence (ie, does change in the hypothesized mechanism precede and predict change in the outcome?). Future treatment outcome researchers should conduct intensive, longitudinal data collections to parse how changes in variables of interest interact across time. However, even when temporal precedence for a putative mechanism can be inferred, the amount of variance in the outcome explained by the mediating construct is often small in magnitude. It is thus likely that multiple processes contribute to symptom improvement during CBT. When assessing these multiple processes, we encourage future researchers to explore main effects, mediating effects, and moderating effects of these processes on one another to predict symptom outcomes, using theoretical considerations as a guide (eg, CBT skill use mediating the effect of the alliance on depression symptom change outcomes).[34] We encourage future mechanistic researchers to take advantage of more sophisticated analytical tools (eg, longitudinal network modeling; multilevel structural equation modeling) that can accommodate relations among multiple candidate processes. Additionally, it may be possible to design treatment studies that directly manipulate mechanistic processes to draw more robust causal conclusions about their effects on treatment outcomes.[8]

The PBT framework, mentioned earlier, may be particularly amenable to the manipulation of mechanistic processes as it specifies particular process of change that may be active and targeted in treatment.[80] By testing how the mechanisms that maintain symptoms vary across patients, including those who receive the same diagnosis or therapy, the PBT framework can allow for fruitful research into both general and unique mechanisms of change in treatment.[81] By studying these mechanisms at a dynamic level as they unfold and impact one another over time, researchers can leverage advanced analytical methods to identify how the effects of these putative mechanisms may change over the course of treatment of specific patients.[82]

Taken together, there is a growing foundation of research on processes of change in CBT. It is likely that increases in therapeutic skills, decreases in maladaptive psychopathological processes, and transtheoretical factors all contribute to symptom improvement during a course of CBT. However, to be more confident that these factors *drive* change in CBT, and to better represent a reality in which multiple constructs likely interact to produce symptom improvement, future researchers must take advantage of innovative trial designs and sophisticated analytical techniques. Continuing to

invest resources in understanding mechanisms of change in psychotherapy is paramount for increasing the potency and parsimony of our protocols with the aim of improving outcomes.

CLINICS CARE POINTS

- Helping patients use cognitive, behavioral, and mindfulness skills more frequently and more skillfully may directly promote improvements in anxiety and depression.
- Generating buy-in for the use of these skills by clearly demonstrating how they can be used to address patients' primary concerns can facilitate patients' skill frequency and quality.
- Helping patients understand that emotions are informative and not dangerous relatively early in treatment may help reduce aversive reactions to those emotions and facilitate subsequent reductions in anxiety and depression.

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