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Facilitating emotional processing in depression: the application of exposure principles

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Abstract

Even with the best psychosocial and pharmacological treatments for unipolar depression, relapse is a serious problem. One path to improve treatments for depression is to target fundamental processes that go awry in depression and to enhance new learning by adapting principles and strategies from exposure-based treatments for anxiety and fear-related disorders. I describe basic principles of exposure and emotional processing and illustrate with Exposure-Based Cognitive Therapy (EBCT) for depression, how these principles can be applied, with some adaptation, to address the therapeutic targets of depression. Clinical trial data of EBCT suggest that this application might be fruitful and that the process of change might be similar to that in exposure-based treatments for anxiety and trauma-related disorders.

In a comprehensive review of randomized controlled trials of treatments for Major Depressive Disorder (MDD), Hollon and Ponniah [1] report efficacy rates of approximately 60% for pharmacological and psychosocial treatments. Rates of relapse after psychotherapy are significantly lower than with pharmacotherapy but still high, and risk increases dramatically with each episode. Once the course of depression becomes recurrent or chronic, treatment becomes even more difficult, with remission rates falling below 50% in intent-to-treat samples [2]. These data highlight the pressing need to improve the long-term effects of treatments for depression.

One path to improve treatments for depression is to target fundamental processes that go awry and adapt principles from treatments for anxiety and fear-related disorders to enhance emotional processing and new learning. Cognitive-behavioral therapies (CBT) for post-traumatic stress disorder (PTSD) have particular relevance, given the common therapeutic targets of unproductive processing, intrusion of disturbing thoughts, images, and memories, and maladaptive attempts at inhibition [3**, 4, 5**].

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Conflict of Interest Statement

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Principles of Exposure and Emotional Processing in Anxiety and Fear-Related Disorders

Exposure-based therapies are among the most effective treatments for anxiety and trauma-related disorders [6]. Exposure therapy involves decreasing the pathological avoidance that maintains these disorders and activating the relevant fear network. This associative network includes cognitions, behaviors, affect, and physiological components [7,8] and becomes pathological when activated in situations that are not inherently threatening. Treatment involves activating the different nodes of the network, and in this context, exposing clients to novel information that violates expectations, challenges beliefs, and destabilizes the pathological network. The discrepancy between the old learning and new information creates the opportunity for *emotional processing*, which is indexed by shifts in perspectives and meaning, together with new emotional responses to the feared stimuli [7,9*,10]. Exposure therapy also has been conceptualized as a way to teach clients to distance (or decenter) from habitual, conditioned fear responses and to increase tolerance for, rather than reduce, distress [11]. Another facet of exposure-based treatments is affect labeling, or putting words (written or verbal) to emotions, which has been demonstrated to facilitate the effects of exposure and extinction learning [12, 13].

Recent developments in human and animal learning research further inform emotional processing theory. Consistent with Foa and colleagues' (7, 9*) assertion that affective engagement is a critical condition of exposure and therapeutic change, both human and animal research suggest that amygdala activation plays a central role in the acquisition, consolidation, and modification of memories of emotional experiences [14]. Research on the neuroscience of memory suggests that reactivating old learning can make it more labile and plastic. With reactivation, old learning either can be reconsolidated and strengthened, or if novel and unexpected information is presented at this time, the old memory can be updated [15]. However, the timing of the reconsolidation window is not yet clear, nor is the extent to which memories can be weakened or changed [16, 17, 18**]. More emphasis is also being placed on strengthening new learning over time and contexts and increasing accessibility so that it can inhibit or compete with the pathological learning [19, 20].

Cognitive-behavioral treatments for PTSD have particular relevance for treating depression because these disorders share some fundamental pathological processes [3**,4,5**]. PTSD is characterized by a repetitive, unproductive processing loop that is maintained by avoidance. Risk for PTSD is increased when traumatic memories are processed at a nonverbal, primarily sensory-perceptual level and encoded in a fragmented, disorganized manner with low conceptual processing. Conceptual processing helps to make meaning of the event in context and encode it in a more chronological and coherent way [4, 5**, 21,22,23]. Without this kind of processing, fear and the trauma-related beliefs overgeneralize to vague and abstract themes that can spread across stimuli, contexts, and time frames, with little discrimination and specificity [21, 24,25,26]. With such generalization, traumatic memories are easily triggered and quickly overwhelm the person's ability to regulate the high levels of distress. Avoidance behaviors and emotional blunting or numbing are used to decrease the likelihood of reactivation and to suppress traumatic

memories. Such avoidance, however, contributes to rebound in the form of intrusions, nightmares, and flashbacks, and a vicious cycle with further avoidance. This unproductive processing loop interferes with meaning-making and emotional processing of traumatic experiences [4,9*,26]

Empirically-supported treatments for PTSD vary in their emphases, but all involve decreasing avoidance, activating traumatic memories, exposure to new information, and facilitating meaning-making and change in maladaptive trauma-related beliefs [27]. All also include verbal and/or written labeling and processing of emotions and beliefs [28]. Productive emotional processing involves more than fear reduction, but also increasing the context specificity of overgeneralized trauma memories, improving discrimination, increasing attention toward information inconsistent with maladaptive beliefs, integrating verbal and nonverbal memories, and making meaning of experiences in the broader context of the person's life [4,5**,21,23,29]. This new learning can then inhibit, or perhaps buffer, the pathological learning. Consistent with this idea of inhibitory learning, Ready and colleagues [30] found that more overgeneralization during the narrative phase of trauma-focused CBT for youth predicted worse outcomes (especially over the 12-month follow-up), but that new learning related to trauma-related beliefs buffered these negative effects. Although preliminary, these findings highlight the potential importance of compensatory or inhibitory learning and of elaborating and solidifying this new learning for relapse prevention.

Application of the Principles of Exposure and Emotional Processing to Depression

Principles from modern learning theory and exposure-based treatments for PTSD can inform the treatment of depression, particularly depression in its more recurrent and chronic forms. There are, however, some adaptations required when applying these principles to depression. Three interconnected processes operate in depression to prolong negative mood, increase sensitivity and reactivity to stressful life events, and interfere with adaptive processing of emotional material. Each must be addressed, if new learning is to occur.

Unproductive processing loop

Depression and risk for depression are associated with an unproductive processing loop that is similar to that described in PTSD. In depression, that loop is particularly easily to activate and hard to disengage. Recent comprehensive reviews [31**, 32**] of information processing in depression converge on two factors that contribute this vicious cycle: negative attention bias and depressive elaboration. Negative events and stimuli capture and fixate attention and prolong negative mood states. Depressive elaboration processes then come on line with the activation of negative schemas (particularly about the self), rumination, and overgeneralization to thematically connected events and memories. This elaboration process is conditioned over time and can become an entrenched habit [33**]. Further, depressed individuals show hyperactivity of the amygdala in response to negative mood stimuli, together with impaired cognitive control in the dorsolateral prefrontal cortex (DLPFC), thus allowing the unproductive processing loop to amplify and continue unchecked [31**, 32**].

Farb et al. [32**] propose that with each episode of depression, neural networks for attention, executive control, and cognitive elaboration become more tightly coupled, thereby lowering the threshold for activation and perpetuating the cycle.

Maladaptive inhibitory processes

Holtzheimer and Mayberg [34] contend that depression is best understood as being “stuck in a rut” from which it is difficult to exit. Indeed, the difficulty disengaging from negative emotion stimuli has been well-documented [31**,35,36]. Episodes of unproductive processing often end in exhaustion, avoidance, numbing, and hopelessness, which can function as shutdown mechanisms. However, these attempts at regulation are not effective, as chronically avoided material tends to flood forward and intrude, reactivating the unproductive processing loop in a process akin to PTSD. Brewin et al. (4) review evidence that those who are depressed report intrusions of similar frequency and intensity as those with PTSD [see also 26]. This chronic vacillation between avoidance, ruminative recycling, and elaboration inhibits the constructive processing of disturbing emotional experiences [4,37**,38,39,40,41]. Potentially corrective information is therefore more likely to be assimilated into existing schemas than to trigger the dissonance necessary for accommodation and schema change [9*,21,23].

It is not surprising that the negative view of the self and associated experiences become feared. They activate an unproductive processing loop that is powerful, consuming, and at times life threatening, when suicide becomes viewed as a viable exit strategy. The negative self-schema and related events are thus key targets of exposure. Exposure and emotional processing techniques can be useful to facilitate constructive processing and meaning-making in depression, but the unproductive processing loop and inhibitory processes are so strong that, if not addressed, they can block new learning and inadvertently induce more depression.

Dysfunctional positive emotion system

The positive emotion system requires more direct intervention in depression because of what Disner et al. [31**] aptly call a “positive blockade.” These authors review neuroimaging studies that demonstrate not only an attentional bias toward negative stimuli, but also a bias away from positive stimuli. In addition, depression is associated with decreased reward sensitivity and learning and with decreased capacity to recognize, process, and sustain positive emotion, with underpinnings in brain reward pathways [42**, 43]. Furthermore, those who are depressed tend to actively avoid positive emotions and dampen those that are activated [44, 45]. Because positive emotions can become feared and avoided, they are additional targets for exposure.

This combination of problems with positive emotion stimuli interferes with the processing of new and potentially corrective information, as information that is positive in nature is not likely to penetrate the positive blockade. Moreover, the positive emotion system cannot be harnessed for its substantial benefits, such as mood repair, buffering or competing with the strong pull into the rut of depression, and “upward spirals” of positive emotion and cognitions that contribute to resilience [46,47].

Exposure-Based Cognitive Therapy (EBCT) for Depression: General Overview

EBCT is an integrative, multimodal treatment that adds principles of exposure and emotional processing to a cognitive therapy foundation for treating depression. It includes 21 sessions delivered in three phases: stress management, exposure and emotional processing, and positive growth [48**]. Written narratives are included throughout the course of treatment as one form of exposure to increase engagement with disturbing material and facilitate processing between sessions [49].

The goal of the first phase is to tune attention and develop modulators to better manage emotions, promote constructive processing of incoming emotional material, and reduce intrusions of old depressive experiences. As in most CBT treatments for depression, clients are taught to identify the habits of avoidance, rumination, and overgeneralization, unhook from the unproductive processing loop, and engage in adaptive coping and problem-solving skills. Mindfulness meditation is introduced to facilitate a decentered, open, and nonjudgmental stance to negative and positive emotion and facilitate constructive processing [50]. Meditation exercises are introduced gradually, as clients must build tolerance to the negative emotions and thoughts that emerge. These steadying exercises are helpful before beginning the more difficult next phase of EBCT.

The exposure phase involves identifying the depressive network with the core negative views of self and associated emotions, action tendencies, and somatic responses. Clients recall two particularly salient events that epitomize the harshly negative view of self. Events relevant to depression often do not meet criteria for the traumatic events of PTSD, but they do involve damage to one's sense of self and identity and profound loss, themes that play repeatedly. In a process akin to imaginal exposure in PTSD, clients describe the event with increasing detail and elaboration and with multi-modal activation of the depression network. The focus is first on reducing fear associated with the negative view of self and the unproductive processing loop, which is now better modulated. With more distress tolerance and distance from emotional material, clients can make sense of and better integrate the verbal and nonverbal, positive and negative aspects of the experiences and do so in a broader context [4,5**]. As in PTSD, the depressive schemas and related memories are less likely to blindsides the person and set off an unbridled unproductive processing loop. In addition, these exercises often reveal positive aspects and strengths of the person that are further developed in the final phase of EBCT.

The positive growth phase involves orienting to the part of self that is more healthy and elaborating and enacting that. This is conceptualized as another form of exposure, as these exercises often evoke another wave of fear related to hope and the possibility of failure and loss of gains. Exposure techniques are used to decrease avoidance and dampening of positive emotions and instead to teach the ability to savor and elaborate positive material. This phase also involves developing and exercising a more positive network of cognitions, emotions, behaviors, and somatic functioning that can inhibit or buffer the negative effects of the depressive network. This is especially important for relapse prevention.

Treatment Outcome and the Process of Change in EBCT

I next describe a program of research to examine the utility of applying the principles of exposure and emotional processing to the treatment of depression and the role of emotional processing in the change process. EBCT has been demonstrated to be associated with significant reductions in depressive symptoms and large effect sizes in an open trial conducted by my research team [51,52**] and in another open trial using a German version of EBCT [53*]. In a recently completed randomized controlled trial [54**], both EBCT ($n = 73$) and cognitive behavioral therapy (CBT; $n = 71$) [55] showed large effect sizes, and the outcomes of two treatments were comparable. The effect sizes across these three studies were in the range of the benchmark effect sizes in a meta-analysis of 35 RCTs of psychotherapies for depression [56]. Thus, the initial findings on the efficacy of EBCT are quite promising.

As in exposure therapy for anxiety disorders, the exposure phase of EBCT is associated with affective arousal, but in the form of transient spikes in depressive symptoms rather than spikes in anxiety. The pattern of symptom change in the three clinical trials was cubic, which is characterized by an initial decrease in depression symptoms, an increase during the exposure phase, and a subsequent decrease in the last phase. Ratings of clients' weekly narratives revealed that more emotional processing occurred during the exposure phase, and emotional processing during this phase (and not earlier) predicted improvement in depression. More session-by-session processing was associated with less unproductive processing and avoidance [51,52]. This pattern of findings was conceptually replicated using self-report measures in the two trials of the German version of EBCT [53,54]. In the comparison with CBT, more emotional processing in the exposure phase of EBCT (but not CBT) predicted improvement in depression. Affective arousal and emotional processing have also been reported to be significant predictors of outcome in emotion-focused therapy for depression [57,58].

In a recently completed process analysis [59**] of the open trial of EBCT [52], we examined whether the process of change involves destabilization of the depressive network (quantified by increased dispersion or variability across a state space grid) and the development of a more adaptive associative network, as proposed in modern emotional processing theory for anxiety disorders [9*,18**,20]. Raters coded the content of clients' weekly narratives for cognitive, affective, and behavioral components of a depressive network and for a positive network. More processing during the exposure phase of EBCT was associated with destabilization of the depressive network and with the development of a more positive network in the last phase of treatment that in turn, predicted less depression at the three-month follow up. As in exposure-based treatments for anxiety and trauma-related disorders, therapeutic change might involve some disturbance to relieve emotional pain [9*, 56] and new learning to inhibit the depressive network and perhaps decrease the risk of relapse.

Conclusion

EBCT is based on a solid foundation of research on the psychopathology of depression, principles of change from treatment research, and principles of wellness and resilience promotion. EBCT applies exposure-based techniques within a cognitive therapy framework, with promising initial efficacy findings and a process of change that appears similar to that in treatments for anxiety and trauma-related disorders. An important next test is to examine the prophylactic effects of EBCT. Our treatment team is developing a smartphone application (app) to monitor and give feedback on the therapeutic targets of EBCT during and after treatment. This technology might be a step toward generalizing the skills learned in treatment to the daily lives of clients.

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* of special interest

** of outstanding interest

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Highlights

1. Principles of exposure and emotional processing might facilitate new learning in depression
2. Unproductive processing, maladaptive inhibition, and processing of positive emotions must be addressed.
3. New learning can be strengthened across contexts to reduce risk for relapse