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Expanding exposure-based interventions for eating disorders

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Abstract

Initial trials evaluating exposure-based interventions for eating disorders (EDs) in the 1980s demonstrated mixed results. Since that time, innovations in exposure therapy for anxiety disorders have yielded insights that can be used to refine and expand the approach to effectively target ED behaviors. This article provides a brief summary of relevant advances in exposure therapy for anxiety and outlines how these advances may be adapted and evaluated for use with ED samples. More specifically, we propose shifting to an inhibitory learning framework, considering treatment targets other than fear, and increasing variability in exposure techniques represent three important areas for future study. Overall, this article aims to provide professionals in the field with a framework for how to incorporate cutting-edge advances in exposure therapy into rigorous intervention research for EDs.

Keywords

anxiety disorders; behavioral treatments; eating disorders; exposure; treatment

1 | INTRODUCTION

Many individuals receiving treatment for eating disorders (EDs) do not experience clinically significant reduction or remission of symptoms (Wilson, Grilo, & Vitousek, 2007).

Accordingly, identifying alternative intervention strategies to enhance outcomes is an important endeavor. Exposure therapy represents one intervention that may hold promise for improving ED outcomes. Initial exposure-based approaches for EDs were developed in the 1980s and derived from exposure and response prevention (ERP) protocols for anxiety disorders. These early adaptations of ED exposure targeted fear-based cues and related

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avoidance behaviors in bulimia nervosa (e.g., exposure to feared food, followed by prevention of subsequent compensatory behavior). Overall, findings from these initial investigations yielded inconsistent results. Additionally, these trials included small samples, potentially limiting statistical conclusion validity. In addition to ERP targeting binge-eating behaviors, several protocols using mirror exposure have been developed to target body image concerns (Delinsky & Wilson, 2006); however, despite promising findings, there has been no expansion of these protocols to additional targets. Recent reviews have presented theoretical rationale for revisiting the application of exposure-based techniques for EDs (Boswell, Anderson, & Anderson, 2015; Murray, Loeb, & Le Grange, 2016). However, empirical study based on these proposals remains in its infancy.

Despite progress in the empirical understanding of exposure for other disorders, study of novel approaches for EDs remains limited, and focused on fear-based stimuli and therapeutic mechanisms. Given marked differences between cutting-edge, exposure-based interventions for anxiety disorders and knowledge regarding exposure for EDs, we propose that renewed systematic efforts must revisit the application of exposure for EDs. The following sections will highlight three specific areas of need that warrant further study and may bolster treatment outcomes: (a) revision of the theoretical framework of ED exposure models, (b) identification of novel treatment targets, and (c) expansion of existing exposure-based approaches and techniques.

2 | UPDATE OF THEORETICAL FRAMEWORK FOR EXPOSURE THERAPY

Exposure interventions were previously believed to extinguish maladaptive behaviors via the process of habituation, whereby learned associations between conditioned stimuli (CS) and unconditioned stimuli (US) are weakened through repeated presentation of the CS in the absence of the US. Consistent with habituation theory, initial exposure-based approaches for anxiety targeted fear-driven avoidance behaviors, based on the supposition that limiting maladaptive avoidance behaviors (e.g., avoidance of situations or cues related to fear-inducing stimuli) would promote habituation of the fear response to a CS. To date, most exposure-based approaches for EDs have subscribed to a habituation model that targets fear-based avoidance of food and related stimuli through use of ERP, in which an individual is repeatedly exposed to feared stimuli and instructed to refrain from engaging in maladaptive avoidance behaviors (e.g., exposed to feared food and asked to consume, rather than avoid food.).

Current exposure interventions for anxiety disorders have identified additional treatment targets and have re-conceptualized treatment mechanisms through an alternative, inhibitory learning model. This model posits exposure exercises promote learning of a new association between the conditioned stimulus and absence of the unconditioned stimulus (CS-no US), rather than habituation, which assumes weakening of the original association (CS-US). The inhibitory learning model also places strong emphasis on disconfirmation of expectancies and increased tolerance of aversive emotions, rather than decreased fear response, as the therapeutic mechanisms driving behavior change (Craske, Treanor, Conway, Zbozinek, & Vervliet, 2014). To date, investigators have yet to apply this model to ED intervention work, leaving possibly powerful treatment targets and optimization strategies untested.

3 | IDENTIFICATION OF ADDITIONAL TREATMENT TARGETS

Fear has historically been considered the central treatment target in exposure-based interventions. However, investigators have identified additional avoidance-related foci that may be worthy of additional consideration. For example, disgust may underlie associations between various stimuli and avoidance behavior. Importantly, disgust-based associations may be more resistant to extinction than associations linked with fear. Some recent work suggests that disgust motivates behaviors characteristic of eating pathology (e.g., food rejection), and researchers theorize that extinction-resistant, disgust-based associations may provide one explanation for inconsistent findings in previous ED-based exposure trials. Thus, future exposure-based interventions should consider explicitly targeting disgust. Another construct relevant in exposure-based treatment of anxiety is intolerance of uncertainty. In the context of eating pathology, intolerance of uncertainty may present a particularly relevant target, given that certain ED behaviors may be performed to increase control over unknown future outcomes and decrease associated anxious arousal. As that EDs generally present with a fear of possible weight gain (among other uncertain outcomes), exposure interventions targeting this construct may prove effective in decreasing ED behaviors that serve to decrease uncertainty. Importantly, these are not the only treatment targets worthy of study in the application of exposure therapy for EDs. Other targets that may be relevant for EDs include anxiety sensitivity, an individual's tendency to experience anxious states as aversive, and distress tolerance, an individual's perceived ability to tolerate negative mood states. As negative affect plays a well-documented role in ED behaviors (e.g., Smyth et al., 2007), both constructs may be useful to address in exposure-based ED treatment. Both anxiety sensitivity and/or distress tolerance may be addressed through eliciting specific emotional states salient to an individual and testing expectations regarding ability to tolerate the emotion or associated emotional cues (e.g., somatic symptoms of anxiety). Overall, investigation of the constructs referenced above, and identification of additional treatment targets, may provide informative avenues of research that could enhance the efficacy for exposure therapy for EDs.

4 | EXPANDING EXPOSURE APPROACHES AND TECHNIQUES

An additional way in which exposure-based interventions may be improved is through considering techniques other than traditionally employed in vivo exercises. More specifically, techniques used routinely in anxiety disorder treatment, such as interoceptive exposure and imaginal exposure, may be relevant to and adapted for use in EDs. First, interoceptive exposure, wherein individuals and therapists purposefully elicit interoceptive sensations associated with anxiety (e.g., dizziness, fullness) to target links between interoceptive cues and maladaptive thoughts and feelings, may be a potentially useful exposure technique for EDs, as altered interoceptive awareness and sensitivity are common (Boswell et al., 2015). Second, imaginal exposures involve developing a detailed script of a feared outcome or event, which the client listens to during and outside of session. As suggested by Murray et al. (2016), the core, fear in AN may be future-oriented in nature (e.g., longer term weight gain and its consequences, rather than weight gain following consumption of one food product). Accordingly, the use of imaginal exposure scripts could enhance a clinician's ability to address idiographic targets, including feared, future

consequences that are not easily addressed using traditional in vivo approaches. Other recent work in PTSD has employed virtual reality technologies, which provide another method for implementing exposures to cues that cannot be targeted using in vivo exercises. A general behavioral model of ED behaviors is presented in Figure 1; elaboration of the ways in which traditional exposures may be adapted for anxiety-based ED behaviors is available in Table 1.

In addition to considering alternative exposure techniques, researchers and clinicians might consider expanding the format and structure of in vivo exposure exercises. Under the inhibitory learning framework, structuring exposure exercises to maximize (a) the discrepancy between the client's expected outcome and the actual outcome, (b) variability in the level of fear, and (c) the number of cues targeted and contexts in which learning is practiced, will best facilitate corrective learning and decrease chances of retrieval of the original association [e.g., spontaneous recovery of extinguished behavior (Craske et al., 2014)]. These aims can be achieved in a variety of ways, and at times, may involve notable alterations to the practice of traditional in vivo exposures. For example, although many exposure manuals outline an approach wherein therapist and client progress stepwise through the client's exposure hierarchy (i.e., moving from low-intensity exercises to increasingly more challenging exercises), more recent application of inhibitory learning suggests that progressing in a random sequence may allow the client to experience varying levels of anxiety and violation of expectations, thereby facilitating a stronger inhibitory, corrective association. Simultaneously presenting multiple stimuli may enhance extinction learning and decrease the probability of fear reacquisition. Increasing the duration of time that an individual is exposed to avoided stimuli or continuing to conduct exposure trials past the point of initial extinction may also deepen therapeutic effects. Finally, another approach that can be readily adapted and tested for use in EDs is counterconditioning, a method in which an individual is presented with a stimulus that had previously acquired a negative, aversive property (e.g., fear response to food item), but is now paired with a positive or rewarding response [e.g., monetary reward (Ludvik, Boschen, & Neumann, 2015)].

Overall, there are numerous ways in which clinicians might deepen extinction in exposure therapy. Ultimately, the specific exercises and targets relevant for an individual case must be determined based on an ideographic assessment of target behaviors and their function, which may vary according to several factors, including clinical presentation and diagnosis, an individual's specific learning history, and an understanding of the existing research base for an exposure technique in EDs. Of note, although the anxiety disorder literature provides an initial starting point from which to generate novel exposure-based investigations, certain features of EDs may prohibit direct translation of existing anxiety disorder protocols. For instance, exposure-based treatments in anxiety disorders function primarily through interrupting patterns of negative reinforcement (e.g., avoidance of fear-producing cues which promotes decreases in negative affect). Although some ED behaviors are maintained through processes of negative reinforcement, other behaviors may be maintained over time through positive reinforcement (e.g., rewarding properties of dietary restriction or exercise) or may be habitual in nature (Steinglass & Walsh, 2006). Therefore, effectively targeting ED symptoms using behavioral techniques will require adaptations to account for differential learning processes. Additionally, unlike many fears reported by individuals with anxiety disorders, some commonly endorsed, ED-related outcomes are rational or likely to occur

(e.g., weight gain). Although this does not preclude use of exposure therapy to address fear-based associations, it requires a shift in how exposures are conceptualized and/or presented. Moreover, targeting avoidance behaviors linked with likely outcomes may require implementation of additional treatment strategies, such as values-based work, to foster willingness to engage in adaptive behaviors. These represent only two of many issues that are relevant when attempting to adapt exist exposure-based interventions for EDs. Although a full discussion of these considerations is outside the scope of this article, empirical work evaluating the feasibility of ED exposure must include discussion of these complexities.

5 | DISCUSSION

Considering innovative, alternative treatment approaches for EDs is a crucial endeavor. Recent advances in exposure-based therapy for anxiety disorders provide an excellent framework from which researchers can develop systematic efforts to evaluate exposure therapy for EDs. Altogether, we believe that cutting-edge, exposure-based interventions provide a range of promising intervention approaches that can be applied to EDs and remain understudied in the field. Therefore, we propose that future research better incorporate theoretical developments in learning theory, through evaluating the utility of alternative treatment targets and testing the effectiveness of different exposure formats and techniques.

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FIGURE 1.

Generalized behavioral model for understanding ED behaviors in an exposure framework. The proposed exposure interventions detailed in the current manuscript focus on exposure to triggers/cues and emotions associated with feared consequences (Boxes 1–2) and prevention of ED behaviors in response (Box 3), promoting interruption of reinforcement processes (Boxes 4–5) and new learning regarding the likelihood of feared consequences without engagement in ED behaviors and/or the individual’s ability to tolerate the consequences and their associated emotional responses

TABLE 1
Examples of anxiety-based treatment targets and exposure-based techniques for eating disorders

Triggers/cues for eating disordered behaviors	Eating disordered behaviors	Potential ED behavior function(s)	Hypothetical treatment target(s)	Proposed treatment technique(s)	Examples of exposure exercises (specific examples provided in parentheses)
Food, fear-based	• Food avoidance	• Reduces fear of weight change via decreased uncertainty (of future weight gain and possible negative social outcomes)	• Conditioned fear response	• Exposure with response prevention (ERP)	• Present individual with avoided food item(s) and prohibited compensatory behaviors (e.g., present with feared high-calorie foods, and prevent compensatory behaviors, encourage tolerance of increased fear of weight gain)
	• Food restriction	• Reduces fear of binge episode or loss of control eating	• Intolerance of uncertainty	• In vivo meal and/or food exposures	• Present individual with avoided food item(s) and prohibit binge eating/loss of control eating with emphasis on increased appetite awareness (e.g., present with feared dessert and prevent binge eating; encourage recognition and tolerance of increased anxiety/fear)
	• Compulsive/driven exercise	•	• Low distress tolerance		
Food, disgust-based	• Food refusal	• Avoids or reduces disgust/revulsion towards food item(s)	• Conditioned disgust to food stimuli response	• Exposure with response prevention (ERP)	• Present individual with avoided food item(s) and prohibit compensatory behaviors (e.g., present with fried, greasy food object and encourage consumption of the food without use of purging/compensatory behaviors)
	• Purging/vomiting	• Avoids or reduces disgust associated with somatic sensations (e.g., sense of fullness,	• Low distress tolerance	• In vivo meal and/or food exposures	

Triggers/cues for eating disordered behaviors	Eating disordered behaviors	Potential ED behavior function(s)	Hypothetical treatment target(s)	Proposed treatment technique(s)	Examples of exposure exercises (specific examples provided in parentheses)
			nausea) following food consumption		
Interceptive cue/s (e.g., fullness, bloated feeling, hunger cues)	• Food avoidance	• Avoids or reduces aversive interoceptive sensations associated with eating (e.g., fullness) or somatic sensations (e.g., skin/muscle jiggling, bloating)	• Interoceptive sensitivity	• Interoceptive exposure (IE) to eating-related somatic sensations (e.g., fullness) and/or food-specific interoceptive sensations (e.g., warm food in stomach, liquid foods) with fear-based associations (e.g., fear of sensation)	• Expose individual to anxiety-inducing interoceptive cues (e.g., purposefully elicit sensations of fullness by rapidly consuming large amounts of water, encourage attention to interoceptive sensations and tolerance of anxiety)
	• Food restriction		• Conditioned anxiety to interoceptive cues		
	• Purging behaviors		• Low distress tolerance		
Body image + fear of shape change and/or weight gain	• Food avoidance or food refusal	• Reduce worry about/decrease uncertainty surrounding potential weight gain following food intake	• Conditioned emotional response regarding weight gain and/or its consequences	• Mirror exposure	• Have individual view feared body parts with mirror exposure (e.g., have individual nonjudgementally attend to stomach or thigh area for extended period of time)
	• Body checking behaviors			• Imaginal exposure	• Develop imaginal script detailing feared consequences of weight gain (e.g., develop script wherein an individual loses friends, becomes social outcast following weight gain)
	• Excessive, driven exercise		• Intolerance of uncertainty	• In vivo exposures/behavioral experiments: expectancy violation	
	• Compensatory behaviors	• Alleviate social appearance or physique related anxiety			• Conduct behavioral experiments to test expectancies regarding likelihood of expected weight gain (e.g., outline
		• Decrease fear of negative appearance evaluation			

Triggers/cues for eating disordered behaviors	Eating disordered behaviors	Potential ED behavior function(s)	Hypothetical treatment target(s)	Proposed treatment technique(s)	Examples of exposure exercises (specific examples provided in parentheses)
					likelihood of immediate, rapid weight gain following consumption of feared food product, then have individual consume product and refrain from compensatory behaviors to test perceived versus actual likelihood of weight gain)
Interpersonal threats and/or stressors	• Avoidance of social situations	• Reduced negative emotion, or decreased strength of emotional state	• Conditioned anxiety response to social situations	• Imaginal exposure	• Develop imaginal script of feared social consequences for use in imaginal exposure (e.g., script wherein the client eats at a restaurant with friends who display disgust related to the client's food consumption)
	• Binge eating or loss of control eating		• Intolerance of uncertainty	• In vivo exposures/behavioral experiments; expectancy violation	
	• Compensatory behaviors	• Alleviate social appearance or physique related anxiety	• Distress tolerance		
	• Food restriction		• Overestimation regarding likelihood of feared outcomes		
		• Decrease fear of negative appearance evaluation			• Engage in feared social situations or purposefully generate feared social situations to test expectancies regarding likelihood of event or individual's ability to tolerate the event (e.g., attend a social gathering centered around food and test expectancies regarding social responses of others)
		• Reduce anxiety about negative social perceptions/judgments regarding food intake (e.g., fear of being negatively evaluated)			

Note. Examples highlighted in this table are likely reinforced by a complex, individual-specific learning history, meaning that the development and maintenance of a single disordered eating behavior is often the result of a complex learning history (e.g., conditioning). In addition, multiple emotions are often associated with characteristic eating disorder symptoms—some of which are not as commonly associated with anxiety-based avoidance behaviors traditionally targeted by exposure exercises (e.g., anger, guilt, sadness, shame). Given this, effective exposure-based treatment efforts for EDs will need to

assume an idiographic approach, with efforts to delineate the function of ED behaviors for the individual seeking treatment to best identify how to target ED behaviors for which exposure techniques would confer most benefit.

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