



## What happens in session *does not* stay in session: Changes within exposures predict subsequent improvement and dropout

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### ABSTRACT

Previous exposure therapy research has suggested potential differences in emotional processing at different points in treatment (Hayes, Hope, & Heimberg, 2008). For example, indicators of emotional processing may be more related to outcome during the later exposure sessions than during the initial session. This is consistent with a growing body of psychotherapy research highlighting the importance of timing and change processes across therapy. The current study examined whether the learning-but-not-benefiting hypothesis is observed in a group based intervention for clients with a range of anxiety disorders. It was hypothesized that activation and within session habituation during later, but not the initial exposure session, would be related to outcome, whereas activation and within session habituation during the first session would be related to dropout status. Results revealed that lower activation and less habituation during the first exposure was associated with increased treatment discontinuation. Second, lower peak and, to a lesser extent greater activation and habituation, during exposures were generally associated with better treatment outcomes. These findings highlight the importance of examining the complexities and timing of the exposure process.

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### 1. Introduction

Exposure-based therapy, which involves having clients confront fearful situations, sensations, and/or images, has long been considered one of, if not the, most efficacious approaches for treating anxiety disorders (Norton & Price, 2007). Although the exact mechanisms of action (e.g., habituation, Lader & Wing, 1966; counter-conditioning, Bouton, 2002; inhibitory learning, Craske et al., 2008; integration of corrective information, Beck & Emery, 1985; Foa & Kozak, 1986) are not fully clear, several models of fear reduction suggest that decreases in state fear levels within exposure sessions underlie the between-session reduction of fear or anxiety-based disorders (however, please see the review by Craske et al., 2008 for several notable exceptions).

Perhaps the most accepted and extensively evaluated theoretical model of anxiety change during exposure therapy is emotional processing theory (Foa & Kozak, 1986; Foa, Huppert, & Cahill, 2005). Within this model, fear and anxiety reduction occur when emotional information structures are activated and modified via

habituation<sup>1</sup> and the assimilation and accommodation of corrective fear-relevant information occurs. According to Foa and colleagues, fear structure activation through the presentation of relevant stimuli is necessary for modification of the fear structure (Foa & Kozak, 1986; Foa et al., 2005; but see Rachman, 1980). Subsequently, corrective information that is incompatible with some aspect of the fear structure, be it cognitive, physiological, or emotional information, must be presented and incorporated into the fear structure. In describing the application of their model to exposure therapy, Foa and Kozak (1986) identify three indicators of emotional processing: (a) fear activation, (b) habituation, as shown by decreased emotional response during the exposure measured as the difference between the peak response and the final response, and (c) modification of the fear structure as evidenced by decreases in initial emotional reactions from session to session measured by comparing the peak response in one exposure trial to the peak response in the next. Craske et al. (2008) put forth recommendations for measuring indicators of emotional processing, including: continuous measurement of self-reported fear and physiology throughout exposures, exposures that are conducted on at least two separate

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<sup>1</sup> We use the term *habituation* in this paper to denote anxiety reduction during exposure, while recognizing that habituation, extinction, and counter-conditioning hypotheses are debated.

occasions, and outcome that is measured independently of emotional processing indicators.

A number of empirical studies have evaluated the principles of emotional processing theory, albeit with somewhat conflicting results. Evaluating the first tenet, that fear activation is required before modification can occur, several studies have shown that individuals who benefited most from treatment also reported higher levels of fear activation during exposure exercises (Borkovec & Sides, 1979; Jansson, Öst, & Jerremalm, 1987; Kozak, Foa, & Steketee, 1988; Lang, Melamed, & Hart, 1970) whereas others have reported that high levels of fear activation can obstruct habituation during exposures (e.g., Foa et al., 1983). Lader and Wing (1966) and Foa et al. (2005) have suggested a compromise: that although fear activation is necessary, extreme levels of arousal may impede emotional processing. As such, exposures activating a moderate level of emotion are suggested to maximize within-session fear reduction and treatment tolerability. Further, Hayes et al. (2008) found partial evidence that participants with social phobia who discontinued treatment in a CBT trial showed less habituation during an exposure session than did those who completed treatment.

Other research has investigated the latter components of emotional processing theory – that reductions in fear within exposures will lead to the incorporation of corrective information and result in decreased activation across presentations of the feared stimuli – with similarly mixed results. Several studies have found that within-session habituation (Beck, Shipherd, & Zebb, 1997; Foa & Chambless, 1978; Grayson, Foa, & Steketee, 1982) and between-session habituation (Kozak et al., 1988) are both related to outcome, whereas others have not demonstrated a relationship between within-session habituation and outcomes (e.g., Foa, Grayson, & Steketee, 1982; Jaycox, Foa, & Morral, 1998; Kozak et al., 1988; van Minnen & Hagenaaars, 2002).

Although modifications of emotional processing theory have been offered to account for these discrepancies (Huppert & Foa, 2004), both Craske et al. (2008) and Hayes et al. (2008) have suggested that the discrepant results might be partly a function of methodological issues and inconsistencies. Specifically, Craske et al. point out that several of the emotional processing studies have not adequately assessed the indicators of emotional processing. Additionally, previous studies have had a number of methodological differences (i.e., graduated vs. constant exposure, various intervals between exposures, imaginal vs. *in vivo* exposures) making it difficult to compare results across studies. Likewise, Hayes and colleagues proposed that much of the existing literature has focused on static or mean anxiety ratings in the first one or two exposure sessions rather than on individual patterns of fear activation and habituations across the course of therapy (please note that exceptions exist, including Jaycox et al., 1998; van Minnen & Hagenaaars, 2002).

Based on clinical experience, Heimberg and Becker (2002) report that clients participating in exposure exercises may have different patterns of fear activation and reduction, and these patterns may result in differential processing of corrective information. This assertion was supported in part by Coles and Heimberg (2000) who, using cluster analysis of data reported during a pre-treatment behavioral approach test among participants with social anxiety, found four distinct patterns of anxiety change that differentially predicted pretreatment anxiety symptoms. Similarly, Jaycox et al. (1998) reported three patterns of subjective anxiety change during exposures among victims of sexual assault. Participants showing high levels of initial engagement and gradual habituation across exposure sessions showed greater improvement during treatment than did clients with high or moderate initial engagement and no habituation.

Hayes et al. (2008) employed an individual growth curve approach to model within-session subjective anxiety ratings

obtained from multiple sessions of a multi-site trial of individual cognitive behavioral therapy for social anxiety disorder. Data from a subsample of 46 clients who completed at least one exposure session during individual treatment<sup>2</sup> showed changes in subjective anxiety during the second and third exposures, but not the initial exposure session, were related to treatment outcome. Specifically, whereas anxiety during the first exposure was unrelated to outcome, trend-level results during the second exposure and significant results from the third exposure suggested that lower initial anxiety ratings and greater habituation within the exposure predicted greater change in anxiety severity over the course of treatment. Hayes et al. (2008) suggested that the lack of effect from the initial exposure may be a function of the specific treatment protocol, wherein the first exposure is set up to demonstrate exposure procedures to clients (Heimberg & Becker, 2002; Hope, Heimberg, Juster, & Turk, 2000). Therefore, clients may be less engaged in the first exposure, which may result in less of an impact on outcome than later exposures, highlighting the importance of examining multiple exposure sessions in studying therapeutic change. It is also possible that clients may be engaged in the first exposure, but because the therapists choose the first exposure more for demonstration that the selected exposure may be less relevant for the client's particular anxiety. In either case, it seems plausible that the first exposure would function differently than subsequent exposures.

Although the Hayes et al. (2008) study provides important preliminary data supporting the emotional processing theory account of within-session habituation leading to greater between-session anxiety reduction, several study design issues must also be considered. First, as with any study, replication is necessary to ensure that the conclusions are not influenced by sample-specific patterns of covariance. Second, given that results were obtained from an evaluation of a single specific treatment protocol (Hope et al., 2000) for a specific diagnostic group, the extent to which the results are generalizable across different populations and CBT protocols is unclear.

Therefore, the purpose of the present study was to attempt to replicate the previous results with a broad sample of individuals with an anxiety disorder diagnosis receiving transdiagnostic group CBT, and to examine the impact of within-session exposure variables on subsequent dropout, while taking into account several of the recommendations put forth by Craske et al. (2008). In this study, we examined multiple exposure sessions that were spaced at least a week apart and we used an outcome measure that was independent of emotional processing. During the exposures, which were graduated, self-reported levels of fear were regularly assessed.<sup>3</sup> It was specifically hypothesized that clients who reported greater activation and more within session habituation during later, but not the initial exposure session, would experience more of a subsequent decrease in anxiety over the remaining sessions of therapy and lower anxiety ratings at the end of therapy. On the other hand, it was hypothesized that clients who reported greater activation and more within session habituation during the first session would be more likely to subsequently drop out of treatment. As suggested

<sup>2</sup> According to Hayes et al. (2008), (47) additional participants received group CBT for social anxiety disorder, but did not complete post-treatment assessments. Therefore, results pertaining to treatment outcome were only relevant for the individual treatment subsample.

<sup>3</sup> While, as Craske et al. (2008) recommend, collecting physiological indicators of emotional processing is the ideal method for assessing emotional processing, data from this study were collected during clinical trials of a group-based intervention. Obtaining accurate physiological recordings was not feasible because (a) differences in exposures (e.g., a social phobic having a small-talk conversation vs. a panicker running on the spot) would differentially impact physiological recordings, and (b) we felt that being connected to recording equipment would take away from the realism and generalizability of the exposures.

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