Available online at www.sciencedirect.com

ScienceDirect

Behavior Therapy 48 (2017) 765–777

Behavior Therapy

www.elsevier.com/locate/bt

Patterns of Anxious Arousal During a Speech Task Between Nonanxious Controls and Individuals With Social Anxiety Disorder Pre- and Posttreatment

Carol S. Lee
Lauren P. Wadsworth
Sarah A. Hayes-Skelton
University of Massachusetts Boston

Although research indicates that anxious arousal in response to feared stimuli is related to treatment outcome (Heimberg et al., 1990), less is known about the *patterns* of anxious arousal. We identified patterns of anxious arousal in individuals with social anxiety disorder (SAD) at pre- ($n = 61$) and posttreatment ($n = 40$; 12-session CBGT, Heimberg & Becker, 2002), and in non-anxious controls (NACs; $n = 31$) using an assessment speech task administered at pretreatment (SAD) or the pretreatment equivalent (NACs), as well as at posttreatment (SAD only). We identified nine patterns of anxious arousal across groups that we further clustered into three groups: fear habituation, fear plateau, and fear increase. Chi-square and adjusted standardized residual analyses revealed that individuals in the pretreatment SAD group displayed the fear habituation patterns significantly more than chance and the fear plateau patterns significantly less than chance. In contrast, NACs displayed the fear plateau patterns significantly more than chance and the fear habituation patterns significantly less than chance. At posttreatment, treatment non-responders displayed fear habituation patterns significantly more than chance, whereas treatment responders displayed the fear habituation patterns significantly less than chance. Findings indicate that fear habituation during an anxiety-provoking assessment task is not necessary for treatment response.

Keywords: social anxiety disorder; subjective units of distress; exposure; speech task; patterns of anxious arousal

SOCIAL ANXIETY DISORDER (SAD) is characterized by persistent fear or anxiety in social or performance situations (*DSM-5*; American Psychiatric Association, 2013). Current models of SAD suggest that clinical levels of fear and anxiety are maintained and exacerbated by the avoidance of these situations (Clark & Wells, 1995; Hofmann, 2007; Rapee & Heimberg, 1997). Although avoidance provides immediate relief by removing the anxiety-provoking stimulus, it ultimately impedes new learning and prevents the production of disconfirming information that may accompany exposure to the stimulus (Arch & Craske, 2011; Craske et al., 2008; Foa & Kozak, 1986). In an effort to address such avoidance, many current cognitive-behavioral therapies (CBT) for SAD incorporate exposure to feared stimuli. Research indicates that managing anxious arousal in response to feared stimuli is highly efficacious at reducing fear and anxiety in anxiety disorders (Craske, 1999), and that decreasing anxious arousal in response to feared stimuli is related to positive treatment outcome (Heimberg et al., 1990). However, less is known about the anxious arousal experienced during interactions with feared stimuli during an assessment speech task at either pre- or posttreatment.

This research was supported by the National Institute of Mental Health (NIMH grant #085060) awarded to the third author. The authors would like to thank our lab managers Daniel Paulus and Megan Garrard; our coders Ryan McCarty, Ashley Daurie, and Tsehay Haile; and the RAs involved in role playing the assessment tasks.

Address correspondence to Carol Lee, University of Massachusetts Boston, Department of Psychology, 100 Morrissey Blvd., Boston, MA 02125; e-mail: carolee1129@gmail.com

Theories on anxious arousal indicate that individuals display different patterns of anxious arousal in response to feared stimuli (Craske, 1999; Craske et al., 2008; Foa & Kozak, 1986; Heimberg & Becker, 2002). For example, Heimberg and Becker (2002) theorized that anxious arousal during exposures in treatment for SAD could be grouped into five observable patterns of anxious arousal: spike, steady decline, asymptote (increasing anxious arousal that levels off), habituation curve (anxious arousal that levels off before decreasing), and low flat line. The authors observed each of these patterns using clients' self-report of anxious arousal (Heimberg & Becker, 2002). Although limitations exist to such subjective measures' consistency in comparison to physiological measures, previous research has indicated that physiological differences do not significantly differ between high and low socially anxious individuals (Mauss, Wilhelm, & Gross, 2004), and that individuals with social anxiety experience a greater awareness of their anxious arousal compared to nonanxious individuals, despite these similar patterns of physiological arousal (Anderson & Hope, 2009). Such findings indicate that it is not the physiological anxious arousal, but rather the subjective perceptions of that arousal, that differentiates high and low social anxiety. However, despite the authors utilizing self-report measures, these self-report patterns of anxious arousal were not explicitly tested and, to our knowledge, no studies have examined these patterns in both individuals with SAD and nonanxious controls, or have related these five patterns to treatment outcome.

Unlike Heimberg and Becker's (2002) theory on the patterns of anxious arousal, the majority of research on patterns of arousal has looked at trajectories as a consideration of peak or mean ratings of anxious arousal during exposures in therapy, rather than the pattern as a whole or pattern changes throughout. The research examining peak or mean ratings of anxious arousal has yielded mixed findings when focusing on the relations between anxious arousal and treatment outcome. For example, although several studies have reported that higher levels of anxious arousal are associated with better treatment outcome (Borkovec & Sides, 1979; Jansson, Öst, & Jerremalm, 1987; Kozak, Foa, & Steketee, 1988; Lang, Melamed, & Hart, 1970), others have reported that high initial arousal impedes habituation during exposure to feared stimuli (Coles & Heimberg, 2000; Foa et al., 1983). Still others argue that habituation is successful for individuals with only moderate levels of arousal (Lader & Wing, 1966), as extreme levels of arousal may impede emotional processing (Foa et al., 2005). Additional research has examined changes in ratings of anxious arousal both within and between exposures, and have determined both to be related to treatment outcome (Beck, Shipherd, & Zebb, 1997; Foa & Chambless, 1978; Grayson, Foa, & Steketee, 1982), though more recent research indicates that only between-exposure change predicts treatment outcome (Huppert & Foa, 2004). However, a more recent study has found both within- and between-exposure anxious arousal to be unrelated to outcome (Baker et al., 2010). Such mixed findings indicate that using a single point of measurement in comparison to examining the pattern of arousal may be insufficient for examining the relations between anxious arousal and treatment outcome. Given the many variations and changes in anxious arousal ratings within a single exposure, examining trajectory patterns as a whole may address these discrepancies in findings, as well as provide further insight into the nature of the variations and changes in these ratings.

In order to examine patterns of anxious arousal as a whole, Hayes, Hope, and Heimberg (2008) examined patterns of anxious arousal ratings during treatment exposures in relation to treatment outcome. The authors found that patterns of anxious arousal that indicated decreasing anxiety between exposures predicted positive treatment outcome. However, the study did not examine patterns of changes in anxious arousal ratings within a single anxiety-provoking event, though they did note that the trajectories of anxious arousal varied within a single exposure to feared stimuli (within-session). Furthermore, the study focused on trajectories of anxious arousal in relation to a habituation pattern only, presenting a narrow theoretical lens to view the many variations in patterns of anxious arousal.

Addressing the limitations of Hayes, Hope, and Heimberg (2008), Norton, Hayes-Skelton, and Klenck (2011) examined the patterns of anxious arousal in exposures both within exposure sessions and between exposure sessions in relation to treatment outcome. The authors concluded that the habituation pattern within session was a stronger predictor of treatment outcome in later exposures to feared stimuli than in initial exposures to feared stimuli. However, the authors examined the trajectories of anxious arousal using only three points of measurement, and only explicitly examined the habituation pattern, thus narrowing the examination of anxious arousal trajectory patterns. Similarly, Price and Anderson (2011) examined trajectories of anxious arousal within a single exposure at the anticipatory and exposure stages of the exposure in relation to treatment outcome. However, the authors examined the trajectories as an averaged latent curve at pre- and posttreatment, thus reducing the attention to individual differences in the examination of the different