

MODELING EXPOSURE PATTERNS ACROSS THERAPY FOR
CLIENTS WITH SOCIAL ANXIETY DISORDER

by

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DISSERTATION TITLE

Modeling Exposure Patterns Across Therapy for

Clients with Social Anxiety Disorder

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MODELING EXPOSURE PATTERNS ACROSS THERAPY FOR CLIENTS WITH SOCIAL ANXIETY DISORDER

Sarah A. Hayes, Ph.D.

University of Nebraska, 2007

Advisor: Debra A. Hope

Treatments that include an exposure component are generally considered to be the most efficacious treatments of social anxiety disorder. However less is know about the exact mechanisms of change in these treatments. To better understand these mechanisms, this study utilized growth mixture modeling to examine the pattern of subjective anxiety during the first four in-session exposures for 95 clients in either individual or group cognitive-behavioral treatment for social anxiety disorder. Both the individual and the group treatments were based on Heimberg's Cognitive Behavioral Group Therapy (Heimberg & Becker, 2002) or the subsequent individual therapy manual (Hope, Heimberg, Juster, & Turk, 2000). Over the course of therapy clients completed, on average, four in-session exposures that each lasted three to ten minutes. During each exposure session clients provided ratings of their subjective anxiety approximately every minute. The pattern of these subjective ratings were analyzed to see if there were distinct classes of clients in each exposure and whether class membership was related to immediate or intermediate outcome. This study also focused on elements of emotional processing theory (Foa & Kozak, 1986), specifically initial activation and within session habituation. Across the four exposures, clients initially expressed moderate anxiety that

decreased across the exposure; however the first and subsequent exposures were differentially related to outcome. There appeared to be two distinct classes of individuals during the second and third exposures based on the variability in their individual anxiety ratings. One class reported consistent anxiety ratings across the exposure while the other report a number of fluctuations in anxiety. While not statistically significant, interesting outcome patterns based on class membership emerged. Few differences emerged between those in individual and group treatment. Implications for emotional processing theory, for dynamic systems theory, and for the methodology used in studying mechanisms of change are discussed.

PREVIEW

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Modeling Exposure Patterns across Therapy for Clients with Social Anxiety Disorder

Social anxiety disorder, also referred to as social phobia, is a debilitating disorder characterized by persistent fear and anxiety in social or performance situations (DSM-IV-TR; American Psychiatric Association, 2000). Approximately 13.3% of the population suffers from clinically significant social anxiety during their lifetime (Kessler et al., 1994). When encountering social situations, socially anxious individuals often experience physiological symptoms of anxiety such as heart palpitations, sweating, blushing, or shaking (Turner, Beidel, Dancu, & Stanley, 1989). People with social anxiety disorder fear that they will fail at social interaction and as a result, they will be embarrassed, rejected, or judged negatively (DSM-IV-TR; American Psychiatric Association, 2000). Along with the central cognitive features of social anxiety (i.e. fears of being negatively evaluated, rejected, or embarrassed), individuals with social anxiety also exhibit behavioral responses such as avoiding or escaping from situations where they may be evaluated such as public speaking, dating situations, meeting new people, eating in public, or attending parties (Craske, 1999). When in these feared situations, performance may suffer (Turner et al., 1989), but often not as much as the socially anxious person fears (Hope, Heimberg, & Bruch, 1995). Many vocational and social difficulties have been noted for individuals with social anxiety disorder (i.e. Schneier et al., 1994). For example, the Epidemiologic Catchment Area (ECA) study found higher rates of outpatient medical treatment, suicidality, financial dependency, and psychiatric comorbidity among those with social anxiety disorder compared to their non-anxious

peers (Schneier, Johnson, Hornig, Liebowitz, & Weissman, 1992). In addition, individuals with social anxiety disorder have been found to have more somatic complaints, make lower wages, have more thoughts of suicide, and be less likely to have graduated college than their non-anxious peers (Katzelnick et al., 2001).

A Model of Social Anxiety

The conceptualization of social anxiety used here is based on a cognitive-behavioral model developed by Rapee and Heimberg (1997). Like other conceptualizations of anxiety (Beck & Emery, 1985), social anxiety is a response to a perceived threat. Here the perceived threat is the reaction from the “audience,” or anyone who may potentially observe the individual. According to this model, the individual with social anxiety is likely to think others are critical while also thinking that it is important to be positively appraised by others. When the individual with social anxiety enters or anticipates a social situation, he or she forms a mental representation of how the audience perceives him or her. This mental representation may be influenced by information from memories of previous experiences, internal cues about the anxiety, or external cues from the audience. At the same time, the socially anxious individual’s attention is focused on this mental representation, perceived threats such as negative cues from the audience, and predictions of the audience’s performance standards. The individual then compares the perceived audience’s standards to his or her own internal representation of self in order to evaluate the likelihood of a negative outcome. This prediction of negative outcomes leads to physiological, cognitive, and behavioral aspects of anxiety which then become

part of the mental representation continuing the cycle. Cognitive-behavioral treatment for social anxiety involves an interruption of this cycle at various points.

Treatment of Social Anxiety

There are several approaches to treating social anxiety. While there has been one uncontrolled study of interpersonal psychotherapy (IPT) for individuals with social anxiety (Lipsitz et al., 1999), most of the extant treatment studies focus on cognitive-behavioral therapy (CBT) or pharmacotherapy. Pharmacological treatments include studies with benzodiazepines (i.e. alprazolam), selective serotonin reuptake inhibitors (SSRIs; i.e. paroxetine), and monoamine oxidase inhibitors (MAOIs; i.e. phenelzine). Cognitive-behavioral treatments often include a combination of cognitive restructuring, exposure, relaxation training, and/or social skills training.

Cognitive restructuring. In the Rapee and Heimberg (1997) model described above, individuals with social anxiety form inaccurate perceptions of themselves and negative predictions about the likelihood of outcomes in social situations. Cognitive restructuring, based on the work by Beck and Emery (1985), addresses these perceptions and biases through identifying negative thoughts, evaluating the accuracy of the thoughts, and deriving a rational alternative.

Exposure. Therapeutic exposure focuses on having the individual with social anxiety confront and engage in anxiety-provoking situations long enough for the conditioning processes involved in fear reduction to occur. The mechanisms behind these conditioning processes are described in more detail below.

Relaxation training. Relaxation training targets the physiological arousal during an anxiety-provoking situation. Most approaches to relaxation training are based on the work of Wolpe (1958) and Bernstein and Borkovec (1973). In these approaches, the individual learns to relax through exercises that involve tensing and relaxing various muscle groups. For social anxiety, relaxation training is often only effective when it is “applied” (Heimberg, 2001). Applied relaxation based on the work of Öst (1987), involves learning to utilize relaxation skills in anxiety-provoking situations to reduce physiological arousal.

Social skills training. Social skills training focuses on improving the quality of social interactions rather than directly improving social anxiety (Otto, 1999). However, when clients do not seem to have the requisite social behaviors in their repertoires, social skills training may be a useful component of treatment (Öst, Jerremalm, & Johansson, 1981). Social skills training generally consists of instruction, behavioral rehearsal, feedback, and homework (Trower, 1995).

Treatment Packages for Social Anxiety

Cognitive Behavioral Group Treatment. One of the most frequently studied treatments for social anxiety is Heimberg’s Cognitive Behavioral Group Treatment (CBGT; Heimberg, 1991; Heimberg & Becker, 2002), which combines in-session exposures, cognitive restructuring and in vivo exposures between sessions. CBGT usually involves 12 weekly two-and-a-half hour sessions for groups of approximately six clients. The first two sessions consist of client education, presentation of the rationale for exposure, and training in cognitive restructuring. The following sessions focus on

therapist-led cognitive restructuring preceding in-session exposures. Homework exposures are designed for the week between sessions.

Individual Cognitive-behavioral Therapy. Recently, the CBGT protocol has been developed for individual 16-week treatment in a client manual by Hope, Heimberg, Juster, and Turk (2000) and an accompanying therapist guide (Hope, Turk, & Heimberg, 2004). In this version of treatment, the first two or three sessions involve client education and self-monitoring. The following two to three sessions involve training in cognitive restructuring. The majority of the remaining sessions involve therapist-led cognitive restructuring followed by in-session exposures. As with CBGT, homework exposures are designed for the week between sessions. The final sessions focus on advanced cognitive restructuring skills and preparation for termination.

Overall Efficacy of CBT for Social Anxiety

In general, CBT has been shown to be efficacious in reducing the symptoms of social anxiety disorder. Four meta-analyses have been conducted to examine the relative efficacy of CBT techniques for social anxiety disorder (Fedoroff & Taylor, 2001; Feske & Chambless, 1995; Gould, Buckminster, Pollack, Otto, & Yap, 1997; Taylor, 1996). These studies found that clients who underwent CBT showed significant improvement in symptomatology over wait-list control groups, with mean effect sizes (*ES*) for CBT ranging from 0.74 to 1.06 and effect sizes for wait-list control groups ranging from -0.13 to 0.03. More specifically, Taylor (1996) compared cognitive therapy, exposure therapy, cognitive and exposure therapy, social skills training, placebo and wait-list control studies of treatment for social anxiety disorder. This comparison showed no differences

between the conditions in terms of dropout rates. In terms of post-treatment effect sizes, all active treatments showed larger effect sizes than the wait-list control group. Only the effect size for the cognitive and exposure therapy group ($ES = 1.06$) was significantly larger than the effect size for the placebo group ($ES = 0.48$). Taylor also examined the effect sizes for the active treatment groups at three month follow-up. Effect sizes from all active treatment groups tended to increase slightly from post-treatment to follow-up (ES post-treatment = 0.63 - 1.06; ES follow-up = 0.93 - 1.08).

In addition to examining the six treatment conditions that Taylor (1996) examined, Fedoroff and Taylor (2001) also included applied relaxation and four pharmacological treatment conditions: pill placebo, benzodiazepine, SSRI, and MAOI. This study found no significant differences between group and individual therapy or between any of the treatments in terms of dropout rates. In general, this meta-analysis revealed that the benzodiazepine ($ES = 2.10$) and the SSRI treatments ($ES = 1.70$) had larger effect sizes at post-treatment. Effect sizes of all of the psychosocial treatments, except for the exposure only group, were significant (cognitive only $ES = 0.72$; cognitive plus exposure $ES = 0.84$; social skills training $ES = 0.64$; and applied relaxation $ES = 0.51$). Interestingly, the exposure only group had the largest effect size (1.08) for the psychosocial treatments; however, due to the large between-study variability, the 95% confidence interval for this effect size was large (-0.13 - 2.29), leading to a non-significant result.

The treatments used in this study are Heimberg's CBGT (Heimberg, 1991; Heimberg & Becker, 2002) and an individualized version of this treatment (Hope et al.,

2000). CBGT has been shown to be more effective than a wait-list control (Hope et al., 1995). In a placebo control study, 75% of CBGT participants showed clinically significant improvement compared to only 40% of the placebo control group (Heimberg et al., 1990). At a five year follow-up, clients who went through CBGT were more likely to have maintained or improved than were clients from the placebo control group (Heimberg, Salzman, Holt, & Blendell, 1993). CBGT has also been shown to be as equally effective as phenelzine (Heimberg et al., 1998). In this study, both CBGT and phenelzine were more efficacious than a pill placebo and an attention placebo.

Lucas and Telch (1993) compared group versus individual treatment using Heimberg's protocol and found no differences in outcome, indicating that Heimberg's protocol is adaptable to individual treatment settings. Preliminary results from the larger treatment study showed a marked decrease in symptomatology from pre- to post-treatment (Effect Sizes (*ES*) ranged from 1.35 - 1.83; Heimberg, 2002). This is comparable to the effect sizes for CBGT (*ES* ranged from 0.84 - 1.13; Heimberg, 2002).

Studies Comparing Exposure Alone and Exposure Plus Cognitive Restructuring

Studies have compared the relative efficacy of treatments consisting of exposure alone to treatments consisting of exposure plus cognitive restructuring. For example, Mattick and Peters (1988) compared exposure therapy with and without cognitive restructuring. They found that the groups did not differ significantly on the outcome measures. However, those in the combined group showed less avoidance at post-treatment than those in the exposure only group. In another study, Hope and colleagues (1995) compared CBGT, an exposure alone condition, and a wait-list condition. In

general, this study found that both the CBGT and the exposure alone treatments were more efficacious than the wait-list control group. However, clients in the exposure only group exhibited slightly more improvement on measures of social anxiety and were more likely to be classified as treatment responders than were clients in the CBGT group.

In terms of meta-analyses, Feske and Chambless (1995) examined exposure alone treatment studies and cognitive-behavioral treatment (CBT) studies and found no significant difference between CBT ($ES = 0.90$) and exposure alone treatments ($ES = 0.99$) on measures of social anxiety. Taylor (1996) also found no significant differences between the cognitive treatments ($ES = 0.63$), the exposure treatments ($ES = 0.82$) or the combined treatments ($ES = 1.06$). While not significant, the effect sizes do increase with the addition of exposure. However, Gould and colleagues (1997) found that exposure alone ($ES = 0.80$) and cognitive restructuring with exposure ($ES = 0.74$) were slightly more efficacious than cognitive restructuring alone ($ES = 0.60$) and social skills training ($ES = 0.60$). Taken together, these meta-analyses suggest that exposure is a key element in CBT for social anxiety disorder and deserves particular attention in future research.

Summary of Treatment for Social Anxiety

In general, CBT has been shown to be an efficacious treatment for social anxiety. One treatment is Heimberg's CBGT, which has been shown to be more efficacious than a wait-list control group and an attention placebo control group and equally as efficacious as phenelzine. It also appears that CBGT can be adapted to an individual treatment format with equal success. While there are many extant treatments for social anxiety, cognitive-behavioral treatments that involve exposure with or without cognitive

restructuring appear to be the most efficacious psychosocial treatment, indicating that exposure is a key component in CBT for social anxiety disorder.

Exposure in CBT

Exposure therapy was first recognized as a treatment for fears in the 1920s when Mary Cover Jones, a student of John Watson's applied classical conditioning techniques to the successful treatment of a young boy's fear of rabbits (Jones, 1924). Today, exposure-based treatments are widely used and have been shown to be effective in reducing fear and anxiety in a variety of anxiety disorders including social anxiety disorder (Foa, Rothbaum, & Kozak, 1989). Exposure places the client in the situations that he or she fears in a graduated fashion.

While exposure techniques are recognized as a key element of CBT, there is less agreement on the mechanism behind exposure. Several competing theories have been proposed on the mechanism behind exposure. Craske (1999) presents several theories on exposure from the behavioral theory of habituation and sensitization to the cognitive based theory of emotional processing to the biological theory based on differential noradrenergic activity. In this proposal, the focus will be on emotional processing theory, which incorporates a habituation element. Emotional processing theory was chosen for this proposal because it is the basis of Heimberg's CBGT and the individualized version of CBGT used in this proposal (Turk, Heimberg, & Hope, 2001). However, before emotional processing theory is discussed in more detail it is helpful to briefly mention the competing theories.

Theories on the Mechanism behind Exposures

Differential noradrenergic activity. Redmond and colleagues demonstrated a link between noradrenergic activity and anxiety and panic by examining the effects of stimulating the noradrenergic neurons in the locus coeruleus of monkeys (Redmond, 1977, 1979; Redmond & Huang, 1979). The locus coeruleus, which has projections to the cerebral cortex and limbic system, is considered to be the major nucleus of the noradrenergic system. Specifically, Redmond and colleagues noted that stimulation of the noradrenergic neurons produced an effect similar to the response that the monkeys had to a natural threat in the environment. Interestingly, noradrenergic activity appears to respond differently to acute versus chronic stress. According to Weiss and colleagues (1982) chronic stress results in an increase in noradrenaline levels in the locus coeruleus, which leads to increased inhibition in the locus coeruleus. This increase in inhibition has the overall effect of reducing noradrenergic activity in the forebrain. Therefore, chronic stress results in an overall decrease in noradrenaline. However, during periods of acute stress there is an overall increase in noradrenaline. Under this theory, exposure therapy serves to reduce the overall level of noradrenaline by triggering the chronic stress mechanism rather than the acute stress mechanism.

Endogenous opioids. In response to pain or fear, endogenous opioids or endorphins are often released. These endogenous opioids serve as an analgesic inhibiting pain. It has been hypothesized that the release of the endogenous opioids serves as a reinforcement to approach a feared situation. The release of the endogenous opioids also may counter the aversiveness of an exposure making it more likely that the client will

approach the exposure situation in the future (Merluzzi, Taylor, Boltwood, & Gotestam, 1991). To further test the hypothesis that endogenous opioids are involved in the mechanisms of exposure therapy, Arntz, Merckelbach, and de Jong (1993) conducted exposure therapy with clients with spider phobias, while giving these clients either low or high doses of an opioid antagonist or a placebo. They found that endogenous opioids reduced behavioral avoidance but had little effect on measures of emotion, cognition, or physiological arousal.

Self-efficacy. According to Bandura (1977), therapeutic gains depend on the degree of self-efficacy, or the confidence that the client has to perform a given task. It is thought that clients judge their self-efficacy through information about performance accomplishment, verbal persuasion, vicarious experience, and physiological arousal. According to this theory, exposure therapy serves to help the client achieve a sense of performance accomplishment, which results in an increase in self-efficacy. For example, in a study of college students with spider phobias, self-efficacy was positively related to behavioral performance (Zoellner, Echiverri, & Craske, 2000).

Extinction. In general, extinction refers to the weakening of the association between a conditioned stimulus (CS) and an unconditioned stimulus (US). The more often the CS occurs without an adverse reaction, the weaker the association becomes. However, recent conditioning models assert that rather than unlearning a CS-US association, extinction involves learning a new inhibitory association, CS-no US (Pearce & Hall, 1980). Bouton and colleagues (Bouton, 1988, 1993; Bouton & Swazentruber, 1991) state that the CS-US association is not erased, but that a new inhibitory meaning of

the CS is learned. Therefore, the CS has the potential to be excitatory or inhibitory depending on the given context. Under this theory, exposure therapy serves to increase the inhibitory CS-no US association, thus reducing the fear produced by the CS-US association.

Habituation. Habituation, which is the reduction in response strength following repeated exposure to a stimulus, was first used to explain exposure therapy by Lader and Wing (1966). More recently, Groves and Thompson (1970) proposed a dual-process theory where the combined effects of habituation and sensitization result in observed behavior. Here, sensitization refers to the increase in response strength with repeated exposure to a stimulus. Under the dual-process theory, the strength of the habituation and sensitizing processes depends on the intensity and frequency of the stimulus. Habituation is inversely related to intensity and directly related to frequency. Since Groves and Thompson, there have been a number of theories of habituation (for a review see Mackintosh, 1987). According to Mackintosh, the model most consistent with the data is the stimulus-response (S-R) pathway model. Under this model, there is a decline in the efficiency of transmission along the S-R pathway with each presentation of stimulus resulting in habituation. While a number of studies have supported habituation theories by showing linear decreases in physiological arousal and self-reports of fear over repeated exposures (i.e. Grayson, Foa, & Steketee, 1982; Parkinson & Rachman, 1980); habituation models do not account for the persistence of some fears following repeated exposure (Rachman, 1990) nor do they explain the benefits of purely cognitive therapy on fear reduction. Habituation has been included as a part of a number of theories on the

mechanism behind exposure (i.e. emotional processing theory); however, it currently does not stand alone as the only mechanism involved.

Emotional processing. The term emotional processing was first defined by Rachman (1980) as a process by which an emotional response decreases. Building on the work by Rachman, Foa and Kozak (1986) developed an emotional processing theory to explain the information structures in memory that are activated when anxiety occurs. According to this theory, anxiety occurs when the information structures that signal escape or avoidance are activated. Fear reduction, the goal of emotional processing, results from the modification of these fear structures in memory through habituation and cognitive change so that they no longer trigger a desire to escape or avoid (Foa & Kozak, 1986). First, it is helpful to understand how fear is represented in memory.

Fear is represented as a network in memory and includes information about the feared stimulus situation; information about verbal, physiological, and overt behavioral responses; and interpretive information about the meaning of the stimulus and response elements of the fear structure (Lang, 1977, 1979). This information is conceived as a program for escape or avoidance. According to Foa and Kozak (1991), if a fear structure is a program to escape danger, then it must involve information that either the stimuli or the responses are dangerous. Within this theory, it is the interpretation, or meaning, of the information as dangerous that activates the fear structure resulting in anxiety. In addition, information about the physiological activity necessary for escape must also be present. While most people experience fear in some contexts, pathological fear is

represented by structures that involve excessive response elements such as avoidance or physiological activity and are resistant to modification.

According to Foa and Kozak (1986), for fear reduction to occur, two conditions need to exist. First the fear structure needs to be activated through the presentation of fear relevant information. Second, information that is incompatible with some aspect of the fear structure needs to be presented and incorporated to form a new memory. Cognitive, emotional, or physiological information can be deemed incompatible when they provide evidence counter to the fear structure. For example, physiological habituation during an exposure provides evidence that physiological arousal can be low even when the feared stimulus is present, thus weakening the fear structure and reducing the anxiety.

Assessing Emotional Processing

According to Lang (1968), anxiety can be measured in three ways: through physiological activity, subjective report, and overt behavior. One way that emotional processing can be assessed is through ratings of subjective units of discomfort (SUDS; Foa & Kozak, 1986; Wolpe & Lazarus, 1967). These ratings provide a subjective report by the client of the intensity of the anxiety that he or she feels at any given time. It should be noted that physiological arousal could also provide evidence of emotional processing. However, devices used to measure physiological arousal could impede the therapeutic process and/or reduce the reality of the exposure. In addition, Marks, Boulougouris, and Marset (1971) found that subjective reports of anxiety better discriminated between phobic and neutral stimuli than did physiological reports.

Role of Emotional Processing for Exposure in CBT

Exposure serves to activate the fear structure while providing a controlled environment so that information incompatible with the fear structure can be presented. In the case of CBT, cognitive restructuring and habituation during the exposure serve to provide the incompatible information. It is believed that the incompatible information reduces the fear and thus the anxiety. Foa and Kozak (1986) describe three responses during exposure-based treatment that are necessary indicators of emotional processing: client self-report of fear activation, which shows that the fear structure has been activated; gradual decrease in the emotional reaction during the exposure, which indicates within-session habituation to the stimuli; and initial emotional reactions that decrease from session to session, which demonstrates that the cognitive structure underlying the disorder has been modified. Previous research has examined various patterns of anxiety during treatment and their relationship to outcome.

Fear activation. Early studies on the physiological arousal experienced during exposure therapy for phobias found that participants who benefited most from exposure treatments also showed an increase in heart rate during the initial exposure (Borkovec & Sides, 1979; Lang, Melamed, & Hart, 1970). Similarly, Kozak, Foa, and Steketee (1988) showed that self-reports of fear activation were positively related to outcome. Jansson, Öst, and Jerremalm (1987) found that individuals with agoraphobia who reported the greatest subjective anxiety at pre-treatment tended to benefit most from exposure-based therapy. On the other hand, a number of other studies have shown that high initial arousal impedes habituation during exposure (i.e. Foa et al., 1983). In a sample of

patients diagnosed with post-traumatic stress disorder (PTSD), improvers and nonimprovers did not differ in terms of mean or peak ratings of SUDS ratings during their first exposure session. However, nonimprovers reported higher levels of anticipatory anxiety than improvers (van Minnen & Hageraars, 2002). Similarly, Coles and Heimberg (2000) found that individuals with social anxiety disorder who had high levels of anxiety at the beginning of the exposure were less likely to improve than were patients showing milder levels of anxiety. According to Lader and Wing (1966), habituation should be more successful for individuals with moderate levels of arousal because they will habituate more rapidly than those who display strong arousal during the exposure.

Beck and Shipherd (1997) found two distinct patterns of anxiety following inhalation of carbon dioxide in patients with panic disorder: habituation to fear and fear sensitization. Those patients that exhibited habituation to fear reported decreases in both pre-inhalation and post-inhalation anxiety across inhalations and demonstrated spontaneous recovery of fear at the beginning of the second session. Those that demonstrated the sensitization pattern, expressed lower levels of anticipatory anxiety, but increases in fear following the inhalations. Beck and Shipherd explain their findings by indicating that, as was shown by Kimmel (1973), the evaluation of stimulus intensity may be critical. They go on to cite a number of studies (Kimmel, 1973; Thompson, Groves, Teyler, & Roemer, 1973; van Olst, 1971) that showed that repeated presentation of a “strong” stimuli typically results in sensitization, while a “weak” stimuli will produce habituation. Taken together with the studies showing that moderate, rather than high,