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DOSED VERSUS PROLONGED EXPOSURES: A DIRECT COMPARISON OF ONE-SESSION TREATMENTS FOR ANIMAL PHOBIAS

by

Richard William Seim

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Philosophy
Department of Psychology
Advisor: C. Richard Spates, Ph.D.

Western Michigan University
Kalamazoo, Michigan
August 2011

DOSED VERSUS PROLONGED EXPOSURES: A DIRECT COMPARISON OF ONE-SESSION TREATMENTS FOR ANIMAL PHOBIAS

Richard William Seim, Ph.D.

Western Michigan University, 2011

It is widely accepted that for exposure-based therapies to be effective fear-eliciting stimuli must be presented continuously until there is a marked decrease in the client's anxiety (e.g., Eysenck, 1979; Foa & Kozak, 1986). However, an emerging body of research (cf. Seim, Waller, & Spates, 2010) suggests that a massed series of very brief exposures (< 150 sec) may be effective in the extinction of fear responses. The present study was designed to compare the efficacy and acceptability of two one-session treatments for animal phobias: one that utilized continuous, uninterrupted periods of exposure to a feared animal (Prolonged Exposures) and the other that utilized a massed series of brief (5-120 sec) exposure trials (Dosed Exposures). 24 adults (7 males, 17 females) between the ages of 18 and 57 years (M = 23.6) participated in this study. Each individual met DSM-IV criteria for a diagnosis of snake phobia or spider phobia. Participants were randomly assigned to one of two the two interventions. Both treatments required participants to gradually enter a room, approach, and eventually hold a live ball python or tarantula. Results from mixed model (between × within subjects) analyses of variance showed that the Dosed Exposure

treatment performed equally well to Prolonged Exposures at decreasing behavioral avoidance, feelings of anxiety, perceptions of threat, and phobia-specific cognitions from pre-treatment to post-treatment, and these gains were maintained at one-week follow-up. Although participants receiving Prolonged Exposures reported lower ratings of within-session anxiety, participants in the Dosed Exposure group had lower rates of treatment dropout, better compliance with procedures, and fewer safety-seeking behaviors during the treatment. These findings suggest that, contrary to popular belief, brief exposure trials can be effective in the extinction of phobic responses under certain conditions.

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ACKNOWLEDGMENTS

There are so many people who have contributed to this work. First, I would like to thank my parents, Bill and Joan Seim. It is their constant love and support that molded me into the person I am today, and it is through their encouragement that I was able to go to graduate school and achieve my dream of becoming a psychologist.

Second, I would like to thank my advisor, Dr. Richard Spates, who taught me not only how to be a good clinician and scientist, but how to approach my work as a passionate scholar.

I would also like to thank the members of my dissertation committee, Dr. Scott Gaynor, Dr. Amy Naugle, and Dr. Ellen Koch, for their helpful suggestions regarding the design and implementation of this study.

Finally, I want to thank all others who helped make this work possible, including my dedicated research assistants, Ms. Chrissy Foster and Ms. Krista Sohn, the WMU Animal Facilities manager, Ms. Lynn Plew, who took solicitous care of the snake and spiders, and the numerous faculty and staff members who guided me and supported my education at WMU.

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CHAPTER I

INTRODUCTION

It is commonly assumed that in order for exposure therapies to be effective fear-eliciting stimuli must be presented continuously until there is a marked decrease in the client's anxiety. However, there are only a small number of studies to support this claim, and many of these studies carry significant methodological shortcomings. Instead, an emerging body of research suggests that a massed series of very brief exposure trials (<150 s) can be effective in the extinction of fear responses. This method of exposure, known as dosed exposure therapy, has been shown to be an effective treatment for PTSD (Renfrey & Spates, 1994), public speaking anxiety (Seim, Waller, & Spates, 2010), injection phobia (Seim, Willerick, Gaynor, & Spates, 2008), and animal phobias (Seim & Spates, 2009). The present study was designed to directly compare the efficacy and acceptability of dosed exposure therapy and prolonged exposure in the treatment of specific animal phobias.

CHAPTER II

LITERATURE REVIEW

One of the most thoroughly studied psychotherapeutic techniques is exposure therapy (Richard & Lauterbach, 2007). Researchers and practitioners from experiential (Wolfe & Sigl, 1998), behavioral (Eifert & Forsyth, 2005), and cognitive-behavioral (Beck, Emery, & Greenberg, 2005) theoretical orientations have all advocated for its use, and hundreds of studies have been devoted to investigating the proper implementation of this technique and the parameters which make it effective. One parameter of exposure therapy which is rarely investigated, however, is the length of each exposure trial. It is often assumed that exposures must be delivered in long, uninterrupted sessions in order to be effective (Eysenck & Kelley, 1987; Foa & Kozak, 1986). This belief is so widespread that the necessity of prolonged exposures is sometimes considered a fundamental axiom of proper exposure therapy.

While decades of translational research and treatment outcome studies have shown that prolonged contact with fear-evoking stimuli (delivered either imaginally or in vivo) presented in a safe, well-controlled environment is effective at reducing anxiety (Richard et al., 2007), there are some downsides to this method. Traditional exposures – whether using in vivo, imaginal, or analog stimuli – often cause the patient to experience significant distress during the treatment (Pitman, Orr, Altman, & Longpre, 1996). This distress makes the exposure therapy difficult to undergo, and it often causes patients to engage in avoidant and safety-seeking behaviors (i.e., "safety behaviors") which dilute the impact of the intervention (Powers, Smits, & Telch, 2004; Wells, Clark, Salkovskis, Ludgate, Hackmann, & Gelder, 1995). In addition, the fear elicited by the intervention

makes some patients unwilling to participate in the treatment in the first place. To get around this, some have suggested only telling patients certain aspects of the treatment at a time (e.g., Öst, 1997, p. 230); however, this option may only be possible in some cases. Finally, the protracted aversive arousal incurred by traditional exposure treatments may lead to client dropout. For example, in their research on exposure therapy for PTSD, Zayfert and colleagues found that up to 40% of patients drop out of therapy due to distress of the treatment or the fear of commencing the treatment (Zayfert & Black, 2000), and even therapists who are trained in exposure therapy are often reluctant to use it out of fear of patient dropout (Becker, Zayfert, & Anderson, 2004). Despite these quandaries, prolonged contacted with feared stimuli is often considered a necessary evil, and some have argued that brief exposure durations may only serve to exacerbate the client's anxiety, not reduce it (Eysenck et al., 1997). To understand this perspective, an abbreviated history of exposure-based therapies is warranted.

Development of Prolonged Exposure Therapies

Though fear-confrontation exercises have been used for over a hundred years and formal exposure-based procedures have been used since the early 20th century (Barlow, 2002), modern experimentation on treatments for anxiety disorders largely began with the technique of systematic desensitization, developed by Wolpe in the 1950s (Wolpe, 1958). Inspired by the experimental work of Pavlov (1927) and the theoretical analyses of Hull (see Eelen & Vervliet, 2006) and Jacobson (1938), systematic desensitization was originally believed to work as a counterconditioning procedure which lessened a patient's likelihood of anxious responding by having them engage in a behavior that is incompatible with anxiety (i.e., relaxation) while they imagined a series of fearful objects

and scenarios presented in a graduated fashion (Head & Gross, 2003). The well-delineated protocol of Wolpe made systematic desensitization a technique that was not only easily taught to and replicated by other therapists, but amenable to scientific dissection (Rachman, 1967). Soon after its introduction, psychologists and psychiatrists in Africa, Europe, and the Americas were conducting dismantling studies and component analyses to investigate the mechanism through which systematic desensitization worked and the parameters which made it most effective. It was eventually found that in vivo exposures were more effective than imaginal exposures (Bandura, Blanchard, & Ritter, 1969; Ultee, Griffioen, & Schellenkens, 1982), that the relaxation component of the technique was unnecessary (Rachman, 1968), and that therapists need not wait for their patient's subjective anxiety to decrease before higher items on the feared stimulus hierarchy are presented (Yuksel, Marks, Ramm, & Ghosh, 1984). Thus, variations of the techniques known as "in vivo graded exposure" and "flooding" were developed.

In addition to this research, studies were conducted to investigate the optimal duration of the exposure trials used in anxiety treatments. Miller and Levis (1971) assigned four adolescent females with non-clinical snake fears to a no-treatment control group or exposure sessions of 15 min, 30 min, or 45 min. The results indicated that the 30 min and the 45 min exposure treatments were more effective than both the 15 min exposure session and the control condition, as measured by the participants' ability to approach a snake after treatment. In addition to significant methodological shortcomings, such as the participants displaying unequal levels of fear at baseline and the between-group differences in total duration time, the external validity of this study is highly suspect, as only one participant was placed in each group.

A larger study was conducted by Stern and Marks (1973) to compare the effects of four treatments on 16 participants presenting with agoraphobia and other travel-related phobias. Each participant received two treatments involving imaginal exposures: one consisting of an 80 min imaginal exposure trial, and another consisting of eight 10 min exposure trials separated by a five min break. Each participant also received two treatments involving in vivo exposures: one consisting of a 120 min exposure trial, and another consisting of four 30 min exposures separated by 30 min rest periods. The participants received all four treatments over the course of two weeks, and the order of the treatments was randomized using a Latin-square design to control for carryover effects. The outcome data indicated that imaginal exposures were ineffective at reducing agoraphobic anxiety, and, while both in vivo exposure treatments helped, the 120 min session produced greater results.

Using this same temporal scheme, Rabavilas, Boulougouris, and Stefanis (1976) investigated the effects of brief and prolonged exposures in the treatment of obsessive-compulsive disorder. Like Stern and Marks (1973), the authors found that imaginal exposures were ineffective at reducing anxiety, and that prolonged in vivo exposures produced greater results than brief in vivo exposures, as measured by reductions in both targeted and overall obsessions.

To compare treatments for public speaking anxiety, Chaplin and Levine (1981) randomly assigned 48 college students to receive either one 50 min session or two 25 min sessions of imaginal exposure. Participants in the prolonged condition reported an increase in anxiety during the first 25 min of exposure, followed by a steady decrease in anxiety, thereafter. Conversely, participants receiving the brief exposures reported an

increase in anxiety during the first exposure trial, a return to baseline during the 10 min break, and another steady increase in anxiety during the second exposure trial. The authors suggested that "interrupting" prolonged exposure therapy impairs habituation, and is thus contraindicated.

A final study, conducted by Marshall (1985), investigated the effects of exposures presented until any slight decrement in anxiety was achieved ("Brief 1" exposures), exposures presented until a 75% drop in anxiety was achieved ("Brief 2"), exposures presented until a 90% drop in anxiety was achieved ("Standard"), and exposures presented for well after a complete absence of anxiety was achieved ("Prolonged"). Results indicated that both standard and prolonged exposures were effective at reducing acrophobic symptoms, while brief exposures produced no significant improvements.

The results of these five studies led to the conclusion that prolonged exposures were necessary in the treatment of anxiety. However, a significant limitation existed across all studies, in that the use of the term "brief" exposures was relative to the comparison groups. In the study by Marshall (1985), the definition of "brief" exposures was not defined by time, but by idiographic changes in each participant's subjective anxiety. And, in the studies of Miller et al. (1971), Stern et al. (1973), Rabavilas et al. (1976), and Chaplin et al. (1981), the durations of the "brief" exposures were between 10 and 30 minutes long. This falls in stark contrast to the original Pavlovian model of extinction as well as research by Baum (1969) which suggests that CS presentations lasting over three minutes in length are no more effective than presentations lasting only three minutes.

Evidence for Intermittent Exposures

A small and often unrecognized body of research provides some support that brief exposures can be effective in the reduction of anxiety. Early research on conditioned fear responses in animals demonstrated that exposures lasting no longer than 15 s could effectively extinguish avoidant behaviors (Black, 1958; Nelson, 1966), research by Berman and Katsev (1972) showed that forty 5 s exposures were more effective than one 200 s exposure, and other research has demonstrated that, regardless of the number of extinction trials, total exposure time is the critical variable (Schiff, Smith, & Prochaska, 1972; Shearman, 1970), even when exposures range between 1 min and 24 min in length (Martasian, Smith, Neill, & Rieg, 1992).

Research on human anxiety has demonstrated promise for brief exposures, as well. For example, dismantling studies (e.g., Rachman, 1968) indicated that the core feature of the systematic desensitization technique was its use of very brief trials of imaginal exposure, usually lasting between five and seven seconds (Head et al., 2003). The reliable results of this treatment kept it the gold standard for well over a decade after its introduction. Indeed, the first study published on "flooding" (i.e., prolonged exposure), found that systematic desensitization produced more favorable results (Rachman, 1966).

In their comparison of brief versus prolonged exposures, Mathews and Shaw (1973) subjected 40 adults with spider phobias to either one 48 min trial or six 8 min trials of imaginal exposure. The results indicated that both brief and prolonged exposures were immediately effective at reducing participants' subjective anxiety and there were no differences in overt behavioral avoidance at one-month follow-up.

Grey, Rachman, and Sartory (1981) randomly assigned 28 participants with various animal phobias to treatments consisting of either one 20 min exposure to a feared animal or ten 2 min exposures. The results showed no significant differences between the treatments regarding subjective reports and behavioral indices of anxiety. However, the authors stated that participants in the two groups differed in heart rates at baseline, and this may have affected their anxiety and responsiveness to the treatment. Thus, an unambiguous interpretation of the results was not possible.

In the late 1980s, a multi-component technique known as Eye Movement Desensitization and Reprocessing (EMDR) (Shapiro, 1989) was developed for the treatment of PTSD and other anxiety disorders. EMDR required patients to imagine a traumatic or fear-eliciting event for approximately 15 s while engaging in rhythmic lateral eye movements (Cusack & Spates, 1999). These imaginal exposures were presented several times during the course of each therapy session, and the exposures were separated by brief inter-trial intervals when the patient was taught to reflect on his or her affective state and replace negative cognitions with more adaptive thoughts. EMDR was roundly dismissed by many cognitive-behavioral therapists, largely because of its weak theoretical basis, its lack of ties to basic research, and its promotion by some as a psychological panacea. However, in spite of these limitations, strong empirical evidence supported the efficacy of this approach (Spates, Koch, Cusack, Pagoto, & Waller, 2008; Wilson, Becker, & Tinker, 1995). A series of dismantling studies was undertaken, and it was eventually discovered that both the saccadic eye movements (Renfrey et al., 1994) and the cognitive exercises (Cusack et al., 1999) were unnecessary components. Thus, it

was concluded that the mechanism behind EMDR was its use of a series of brief exposures (Spates & Koch, 2003).

Harkening to Wolpe's original emphasis on what he referred to as brief "doses" of exposure (Wolpe, 1958, p. xi), Spates and colleagues began a series of experiments on what was termed "dosed exposure" therapy (Spates & Seim, 2005). In line with the Pavlovian model of exposure, the dosed exposure technique utilizes a series of very brief exposure trials (< 150 s) which are separated by brief inter-trial intervals (i.e., the exposures are massed).

Waller (2004) investigated the efficacy of this approach in the treatment of public speaking anxiety. Using a multiple baselines across subjects design, three participants were asked to deliver an impromptu speech in front of a small audience by speaking for 30 s, taking a 30 s pause, and then speaking again for 30 s until they had a significant reduction in their subjective anxiety. Pre- to post-treatment comparisons using a behavioral avoidance test which required the participants to deliver a 3 to 10 min speech indicated that anxiety was reduced across subjective, behavioral, and physiological measures. When compared to three participants who received a similar treatment using prolonged exposures, the dosed exposure treatment was shown to produce less within-session anxiety and more consistent reductions in autonomic arousal. While the small number of participants limits the generalizability of its results, this study does provide some evidence for the use of in vivo exposures presented in a dosed fashion.

Using a similar stimulus dosing procedure, Seim, Willerick, Gaynor, and Spates (2008) treated a woman with an 18-year history of severe injection phobia. By presenting still images, video displays, drops of fake blood, and actual needles and

syringes in a massed series of exposure trials lasting between five and 120 seconds, the participant's subjective anxiety and phobic symptoms were significantly reduced in one session, and she was eventually able to receive a series of finger pricks, vaccinations, and a booster shot. In addition, the participant's lifelong history of fear-induced vasovagal syncope (fainting reflex) was effectively eliminated, as measured by one-week and one-year follow-up assessments.

Larger N studies have also been conducted. Rubin, Spates, Johnson, and Jouppi (2009) compared the effects of four forms of imaginal exposure in the reduction of public speaking anxiety. 39 participants were randomly assigned to one of four conditions. In the first condition, the participants received 2.5 minutes of exposure to an imagined public speaking scene. In the second condition, participants received ten 15 s trials of exposures separated by 30 s inter-trial intervals. The third and fourth conditions were identical to the second condition, except they supplanted the empty inter-trial intervals with 30 s periods involving positive or negative imagery, respectively. Results indicated that the second and third conditions produced less aversive arousal and more rapid reductions in anxiety than the first and fourth conditions.

Finally, a study by Seim and Spates (2009) examined the efficacy of in vivo dosed exposures in the treatment of snake and spider phobias. Ten participants meeting DSM-IV criteria for specific animal phobias were each treated in a single 3 ¼ session involving direct contact with a python or a tarantula. The sessions required participants to undertake 17 behavioral tasks to learn to approach the animal and hold it in their hands. Each task consisted of five to six exposure trials between 5 and 120 s in duration, and each trial concluded with a 45 s break outside of the therapy room. Data collected

post-treatment and during one-week and three-month follow-ups indicated that the treatment resulted in clinically significant improvements in behavioral avoidance, autonomic arousal, subjective anxiety, and cognitions of threat.

Summary

It is clear that there are decades of evidence demonstrating that prolonged exposure therapies are effective treatments for anxiety. However, the aversive nature of these interventions makes many unwilling to undergo or complete treatment. Despite claims that prolonged, continuous contact with feared stimuli is a necessary parameter of exposure therapy, there are only a handful of studies to support this notion, and each of these studies carry methodological shortcomings, particularly in regards to their use of the term "brief" exposures. A small but growing body of research suggests that very brief exposures separated by brief inter-trial intervals ("dosed" exposures) can effectively eliminate fear responses. However, treatment outcome research directly comparing dosed exposures with traditional prolonged exposures has yet to be conducted.

CHAPTER III

PROPOSED STUDY

This study directly compared two empirically supported exposure-based therapies for specific animal phobias: dosed exposure therapy and prolonged exposure therapy.

Dosed Exposure Therapy

The dosed exposure treatment was based on the intervention used by Seim et al. (2009). This treatment has been shown to be effective at eliminating snake and spider phobias. It incorporated four key parameters:

Brief, Incrementing Exposure Trials

Instead of incorporating continuous contact with feared stimuli, the dosed exposure therapy consisted of a series of very brief exposure trials. Each gradation of the treatment began with a 5 s exposure, and the length of subsequent exposures gradually increased to 60 or 120 s. No exposure trial lasted longer than two minutes.

Brief Inter-trial Intervals

Each exposure trial was separated by only a 45 s break period, where the participant was completely removed from the targeted feared stimuli. Research using both animals (Cain, Blouin, & Barad, 2003; Pereya, Portino, & Maldonado, 2000) and humans (Rowe & Craske, 1998) has shown that frequent presentations of exposures (i.e., massed treatments) are better at fostering extinction than exposures with longer inter-trial intervals (i.e., spaced treatments).

Facilitation of Approach Behaviors

Instead of having the feared stimuli (held by the therapist) gradually approach the participant, this treatment required each participant to physically approach the animal.

Research has demonstrated that active participation during treatment may be more effective than passive participation, even during imaginal exposures (Rentz, Powers, Smits, Cougle, & Telch, 2003). This comports with many mindfulness-based treatments, which encourage clients to act towards a valued goal in spite of their anxiety (e.g., Hayes, Strosahl, & Wilson, 1999; Morita, 1998), and with self-efficacy theory (Bandura, 1977), which suggests that anxiety treatment outcomes are not dependent on mere contact with feared stimuli but on the client's sense of control over their behaviors and their ability to keep in contact with the feared stimulus.

Response Prevention

To extinguish the negative reinforcement of fear responses, participants were instructed to keep in contact with the feared stimuli during the entirety of each exposure trial. In addition, participants were discouraged from engaging in safety behaviors and mental distraction techniques, as these are likely to impair the treatment.

Prolonged Exposure Therapy

The prolonged exposure treatment used in this study was similar to the one-session in vivo exposure treatment developed by Öst (1989, 1997). This treatment can usually be completed in three hours, and long-term follow-up results are favorable (Zlomke & Davis, 2008). Unlike Öst's treatment, the prolonged exposure treatment used in this study eliminated cognitive exercises, such as explicitly challenging fearful thoughts with behavioral experiments. Research by Koch, Spates, and Himle (2004) showed that these cognitive exercises are not essential to the treatment, and the use of cognitive exercises in the present study would have presented a potential confound regarding the efficacy and acceptability of the treatments. Like the dosed exposure

treatment, the prolonged exposure treatment facilitated active participation during the exposure and prevented escape and avoidant responses from participants. However, this treatment did not utilize brief exposure trials and inter-trial intervals.

CHAPTER IV

HYPOTHESES

The research question addressed by this study was whether dosed exposure therapy for the treatment of animal phobias is as effective as prolonged exposure therapy. This question was examined through the empirical analysis of four hypotheses:

1. Dosed exposure therapy will produce equivalent reductions in anxiety as prolonged exposure therapy, as measured by behavioral tests, subjective ratings, and standardized self-report measures.
2. The average total treatment time for dosed exposure therapy will be within one hour of the average total treatment time for prolonged exposure therapy.
3. Participants will be less likely to engage in safety behaviors and be less likely to exhibit behavioral indices of distress during the dosed exposure treatment than during the prolonged exposure treatment.
4. Participants will find the dosed exposure treatment less aversive and more acceptable than the prolonged exposure treatment, as measured by physiological and paper-and-pencil measures.

CHAPTER V

METHODS

Participants

Participants were recruited through speeches delivered to college classes and through flyers posted around the campus of Western Michigan University (see Appendices C-E). Fifty-eight males and females contacted the researchers to learn more about the study. After speaking with a member of the research team, 27 of these individuals stated that a fear of snakes or spiders affected their lives in a significant way and decided to schedule an appointment to participate in the study. Phobia diagnoses were made using the specific phobia interview from the Anxiety Disorders Interview Schedule (ADIS-IV; Brown, Di Nardo, & Barlow, 1994), a structured clinical interview based on the DSM-IV (American Psychiatric Association, 2000). The ADIS-IV has been demonstrated to be a valid measure of specific phobia with high test-retest reliability (Brown, Di Nardo, Lehman, & Campbell, 2001), and it has been used as an inclusionary measure in many other treatment outcome studies on animal phobias (e.g., Koch et al., 2004; Öst, Ferebee, & Furmark 1997). Two participants did not meet diagnostic criteria, and another participant completed all nine steps of the BAT-1 assessment (see below). Therefore, these participants did not qualify for either treatment.

The final sample consisted of 24 adults (7 males, 17 females) presenting with significant fears of snakes (n = 10) and spiders (n =14). Eighteen participants identified as Caucasian, two as African American, one as Hispanic/Latino, and three as multiracial. The age range of participants was between 18 and 57 years, with a mean age of 23.6 years (SD = 9.79).

Each participant had a long history of phobic symptoms (2-47 years) which began around age 7, on average. Five participants reported their symptoms were due to first-hand negative experiences with the feared animal, four participants stated their symptoms were due to vicarious conditioning (e.g., witnessing their mother's reaction to spiders), and fifteen participants did not know the origin of their phobias.

Twenty-two participants meet full DSM-IV criteria for a diagnosis of a specific animal phobia, while two participants met all criteria with the exception of Criterion E (i.e., the fear significantly interferes in the person's life or the person has marked distress about having the phobia). In addition to this measure, all participants included in the study were unable to stand closer than three feet from a glass cage containing the feared animal. Other inclusionary criteria were that all participants were over the age of 18 and all had the ability to provide informed consent. Exclusionary criteria included a self-reported history of heart or ambulatory problems, a commencement or change in psychotropic medications during the past month, or visible or recognizable signs of intoxication from a substance at the time of the experimental session(s).

Two standardized instruments were used to measure general symptoms of anxiety at pre-treatment: the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986) and the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The ASI is a 16-item self-report measure designed to assess for participants' general sensitivity to internal sensations and their likelihood of evaluating anxious arousal as threatening. The average ASI score amongst participants was 24.8 (SD = 9.0). This was slightly higher than averages for other individuals with

specific phobia (ASI = 20), as reported by Rapee and colleagues (1992). There was no significant difference in ASI scores between treatment groups.

The STAI consists of two 20-item subscales which are designed to measure participants' current feelings of anxiety as well as the general amount of anxiety they experience day to day. Both measures have been shown to have good reliability and validity. The mean score on the State Anxiety subscale was 46.4 (SD = 12.7), which is higher than average scores for this age group and similar to those evoked during conditions when one has to take a difficult exam (Spielberger et al., 1983). The mean score on the Trait Anxiety subscale was 39.3 (SD = 11.6). This score is within one standard deviation of average scores on this subscale (Spielberger et al., 1983). There was no significant difference in STAI scores between groups.

Design

This study employed a treatment-comparison strategy (Kazdin, 2003) and utilized a between-groups design. This design was selected because it allowed for direct comparisons to be made regarding the efficacy and acceptability of two treatments, prolonged exposure and dosed exposure. Each participant was treated separately in this experiment, and the participants had no contact with each other during the experimental sessions.

The study consisted of five periods: a Pre-Treatment baseline session, a Treatment session, a Post-Treatment session, a One-Week Follow-Up session, and a Three-Month Follow-Up session. During the pre-treatment baseline session, participants were given a behavioral avoidance test which measured how close they were willing to stand near a

feared animal (see BAT-1 below). Participants were randomly assigned to treatments based on their scores on this test using a stratified random sampling procedure.

Setting

Three rooms were used in this study. The diagnostic interview and all paper-and-pencil measures were completed in one of the small therapy rooms in the 2500 suite of Wood Hall on the campus of Western Michigan University. The treatment session was conducted in 2521 Wood Hall, a windowless room measuring 15' long. A glass cage containing a snake or a spider was placed at the end of the room diagonally opposite from the entrance. The snake used was a ball python, a venomless animal known for being a docile pet. The spider was a Chilean rose-haired tarantula. Both animals were housed and cared for according to the standards of the Western Michigan University Institutional Animal Care and Use Committee (IACUC). Six lines were placed on the floor measuring 15, 12, 9, 6, 3, and 0 feet away from the cage. In addition, a 4' x 6' area was sectioned off directly outside of the exposure room. This area was used for the break periods between exposure trials.

Dependent Variables

Behavioral Avoidance

The primary outcome variable measured in this experiment was each participant's avoidance behavior with respect to the feared animal. This was measured using two Behavioral Avoidance Tests (BATs). BATs are commonly used in phobia treatment studies (e.g., Koch et al., 2004; Powers et al., 2004; Waller et al., 2004). While self-report measures allow researchers to measure participants' beliefs about their fears, BATs are more valid measures of actual phobic behaviors. The first BAT (hereafter referred to

as BAT-1) measured how close each participant was able to be near an open (lidless) cage containing the snake or the spider. BAT-1 consisted of nine steps:

1. Standing outside of the room containing the animal
2. Standing 12 feet away from the animal
3. Standing nine feet away from the animal
4. Standing six feet away from the animal
5. Standing three feet away from the animal
6. Standing directly in front of the animal's cage
7. Placing one's hands on the sides of the cage
8. Placing one's hands on the rim of the cage
9. Placing one's hands on the inside glass of the cage

The second BAT (i.e., BAT-2) was based on time rather than distance. Each participant was asked to hold the previously feared animal in their palms while the therapist stood nine feet away from him or her. The total amount of time that the participant was willing to hold the animal (up to two minutes) was recorded.

Heart Rate

Participants' heart rates were measured during each session of the experiment using a mobile heart rate monitor. This monitor was attached to the participant's chest with a nylon strap. ECG sensors from the device transmitted heart rate data to a wristwatch worn by the therapist.

Subjective Anxiety and Threat Perception

Three measures of each participant's affective states were monitored during the BATs and the treatment: subjective feelings of anxiety (SUDS), subjective feelings of

danger, and subjective feelings of control in regards to the animal. Each of these measures was based on a 101-point scale (i.e., 0 = no anxiety; 100 = the most anxiety possible).

Self-Efficacy

Participants' beliefs in their ability to perform a behavioral task were assessed before and after each exposure task. In accordance with the recommendations of Williams (1996), participants were not asked to rate their willingness to perform the task or to predict if they would complete the task. Instead, they were asked to indicate how capable they believed they were in completing the task on a scale from zero (incapable) to 100 (completely capable).

Phobic Symptoms

Each participant completed an Animal Questionnaire and an Animal Fears Scale, paper-and-pencil measures designed to measure phobic symptoms. The Animal Questionnaire consisted of the Snake Questionnaire (Klorman, Hastings, Weerts, Melamed, & Lang, 1974), a 30-item true or false questionnaire, or the Spider Questionnaire (Klorman et al., 1974), a similar 31-item questionnaire. These measures were designed to measure the distress, disgust, and avoidance participants believe they would have in real-life situations involving snakes or spiders, respectively. Both questionnaires have been empirically shown to be valid measures of phobic cognitions.

The Animal Fears Scale consisted of either the Snake Fears Scale or the Spider Fears Scale, two unpublished measures of phobic cognitions. These measures were previously used in the Seim (2009) study and were used in this study for two reasons. First, unlike the Animal Questionnaires which require participants to answer questions as

true or false, the Animal Fears Scales contain 5-point Likert scales, which allow participants to not only endorse but to rate the severity of certain fears. Using this format allows researchers to track decreases in fears which have not been fully extinguished. For example, after receiving treatment a participant may still endorse having a fear of spiders biting him or her but the severity of this fear may have decreased. The second reason these scales were used was that they are designed to measure different types of symptoms than the other measures. While the Animal Questionnaires were designed to measure distress and disgust using very specific real-life scenarios (e.g., a spider crawling on the ceiling over one's bed, a snake appearing on a movie screen) the Animal Fears Scales are designed to measure more general fears which may actually be experienced during the treatment (e.g., "Fear of holding a spider in my hands," "Fear of angering or frightening a spider," "Fear of a snake biting me.").

Safety Behaviors and Indices of Distress

Overt safety behaviors which may be detrimental to treatment outcomes were monitored using a checklist. The safety behaviors assessed included the following:

1. Closing Eyes – This is defined as the participant closing their eyelids for more than five seconds during an exposure trial.
2. Covering Face – This is defined as the participant using their hand or forearm to cover or shield their eyes, nose, or mouth for any period of time during an exposure trial.
3. Turning Away – This is defined as the participant turning their head or body away from the feared animal for more than five seconds during an exposure trial.

4. Holding Self – This is defined as the participant grabbing a part of their body for more than five seconds during an exposure trial.
5. Holding Out Arms – This is defined as the participant extending at least one arm towards the feared animal in any way that is not mandated by the treatment. Extending an arm to pet or hold the feared animal will not be considered a safety behavior.
6. Moving Backwards – This is defined as the participant moving both feet backwards or moving their chair backwards during an exposure trial unless requested to do so by the therapist.
7. Asking for Help – This is defined as the participant requesting the therapist to re-model a task or to provide any physical aid that is not explicated in the treatment protocol.
8. Asking for Reassurance – This is defined as the participant asking the therapist to reassure their safety at any time during an exposure trial.

Any occurrences of these behaviors were recorded by the therapist after each exposure trial along with three behavioral indices of distress: eye watering, crying, and shaking.

Treatment Acceptability

Treatment acceptability was measured using the Distress/Endorsement Validation Scale (DEVS; Devilly, 2004), a 10-item questionnaire that indicates a participant's satisfaction with therapy. The DEVS includes two subscales: Distress, which measures the anxiety experienced by the participant during the treatment, and Endorsement, which rates the participant's satisfaction with the results of the intervention and their willingness to recommend the treatment to others. The DEVS has been used in previous phobia

treatment outcome studies (Koch et al., 2004; Seim et al., 2009), and it has demonstrated good reliability in discriminating participants' responses to different treatments (Devilly, 2004).

Procedures

Informed Consent

After expressing interest in the study through phone calls or emails to the Anxiety Disorders Laboratory, participants were invited to participate in the Pre-Treatment baseline session. Participants were given an informed consent document to read (Appendix F). This document provided an overview of the study and detailed the participant's right to participate or abstain from participating. It also stated that participants have the right to withdraw from the study at any point in time without penalty. After the participant read and signed this document, the study session began.

Pre-Treatment Session

The participant was first asked to look at the Exclusionary Criteria form (Appendix G) and then asked if they could answer 'yes' to any of the statements listed. If a participant indicated that he or she could answer affirmatively, the therapist would have informed him or her that he or she was ineligible to participate in the study and a list of nearby counseling centers would have been provided if further therapy was requested (Appendix H). If a participant did not endorse the statements, the therapist asked him or her complete the Demographics form (Appendix I), which solicited for basic demographic information, comorbid fears, the history of the participant's fear, and his or her perceived likelihood of success in treatment. After this was completed, the therapist administered the ADIS-IV Specific Phobia Interview to determine if the participant met

criteria for a diagnosis of specific animal phobia. If the participant met diagnostic criteria (with the possible exception of Criterion E), the study proceeded. If the participant did not meet criteria, the therapist would inform him or her that he or she was ineligible to continue and a list of counseling centers would be offered.

Next, each participant completed the Anxiety Sensitivity Index and the State-Trait Anxiety Inventory. Also, depending on the participant's fear, he or she was asked to complete the Snake Questionnaire and the Snake Fears Scale (Appendix J) or the Spider Questionnaire and the Spider Fears Scale (Appendix K).

After this, the therapist gave the participant the sensor-band of a mobile heart rate monitor. The therapist instructed the participant on how to wear the monitor, and he then left the room while the participant attached the sensor to his or her chest.

Next, the participant was escorted to a chair outside of the therapy room and asked to sit while the therapist recorded his or her baseline heart rate and ratings of subjective anxiety and threat perception. After these recordings were made, the therapist opened the door to the exposure room and asked the participant to stand as close as they could to the feared animal, as prescribed by the BAT-1 (see above).

Following this, the participant was escorted back outside of the room where his or her heart rate and subjective ratings of anxiety and threat perception were again recorded. Based on the results of the BAT-1, the participant was then assigned to either the Dosed Exposure (DE) or the Prolonged Exposure (PE) conditions, and within 48 hr – if not immediately – the treatment session commenced.

Treatment Session

Both treatment conditions involved participants learning to approach, make contact with, and hold a live animal. The tasks required of participants were identical across conditions; however, the frequency, duration, and intervals between each of these tasks differed between the two conditions. All treatment sessions were video recorded.

Dosed Exposure Condition (DE). The DE condition consisted of 17 tasks, and each task was divided into four to six epochs. Each epoch consisted of an exposure trial ranging from 5 to 120 s in duration and a 45 s inter-trial interval (see Appendices L & M). The first eight tasks were equivalent to the last eight steps of the BAT-1. Each participant's treatment began at the task coinciding with the last step he or she completed in the BAT-1. For example, if the participant was able to stand 3' from the cage during the BAT-1, the DE treatment began at Task #4 (the same distance).

Each task was explained to the participant and modeled by the therapist before the participant was asked to complete it. For example, if the treatment began at Task #1, the therapist entered the room and stood on the line marked 12' away from the cage before the participant was asked to do the same and stand next to him. The therapist then instructed the participant to focus on the animal during the entire exposure and avoid looking away or thinking about other things. After 5 s, the therapist escorted the participant back outside of the room, closed the door, asked the participant sit in the chair, and then recorded the participant's heart rate and subjective feelings of anxiety, danger, and control. A visual analog scale (Appendix N) was shown to the participant to aid in the consistency of his or her subjective ratings. The therapist also noted the occurrence of any safety behaviors or indices of distress during that exposure trial. After

45 s passed, the therapist escorted the participant back into the room and asked them stand on the same line for 10 s. He then took the participant outside of the room, closed the door to the exposure room, and recorded the participant's heart rate, his or her subjective feelings of anxiety, danger, and control, and the occurrences of safety behaviors and indices of distress during the 10 s exposure trial. This sequence of incrementing exposure trial durations and 45 s inter-trial intervals continue until the participant completed the last trial of the task.

At the end of the task, the therapist then showed the participant another visual analog scale (Appendix O) and asked him or her to rate how capable he or she believed they would be in completing this task again on a scale from 0 to 100. The participant's response was then recorded on the Participant Monitoring form (Appendix Q). After this, the therapist informed the participant of the next task, he modeled the requisite behavior to the participant, and then the first trial of that task began.

The first five tasks of the DE treatment taught the participant to enter the exposure room and approach the caged snake or spider. The trials for each task graduated up from 5 s to 30 s. Tasks 6-8 graduated up from 5 to 60 s in duration and involved the participant learning to place his or her hands closer and closer to the animal.

After these tasks were completed, the therapist placed the snake or spider in a large plastic tub (30" x 24" x 18") in the middle of the exposure room. The larger space, the smoother surface, and the lack of corners of the tub tended to make the snake and spiders easier to handle, but also more restless. The participant was then brought back into the room to complete Tasks 9 and 10, which required him or her to approach this tub. Tasks 11-17 differed between DE snake and spider treatments.

DE Snake Treatment Tasks 11-17

Task 11 – The therapist held the snake in one hand. The participant then touched the back of the therapist's other hand as he touched the snake's back. The trials ranged from 5 to 30 s in duration.

Task 12 – The therapist held the snake in one hand while the participant touched the snake's back with two fingers. These trials ranged from 5 to 60 s in duration.

Task 13 – The therapist held the snake in one hand while the participant stroked the snake's back with his or her fingers. These trials ranged from 5 to 60 s in duration.

Task 14 – The therapist gently stretched the snake's body, leaving about six inches of the snake exposed between his two hands. The participant then placed his or her fingertips under the snake's belly. These trials ranged from 5 to 120 s in duration.

Task 15 – The snake was again elongated and then lowered onto the participant's upward facing palms, allowing him or her to feel the weight of the snake while the therapist controlled the snake's head and tail. These trials ranged from 5 to 120 s in duration.

Task 16 – The participant held the snake in his or her hands while the therapist stood next to him or her. These trials ranged from 5 to 120 s in duration.

Task 17 – The participant held the snake in his or her hands while the therapist stood nine feet away from him or her. This task consisted of one trial, 120 s in duration.

DE Spider Treatment Tasks 11-17

Task 11 – The participant reached into the tub and gently touched the spider's back legs with a sheet of card stock, moving it forward. The therapist then guided the

participant in learning how to move the spider and steer its direction using the card. These trials ranged from 5 to 30 s in duration.

Task 12 – Using the card, the participant steered the spider into a plastic cup. The participant then sealed the spider in the cup with the card and picked it up. These trials ranged from 5 to 60 s in duration.

Task 13 – The participant touched the back of the therapist's hand while he moved the spider forward using his fingers. These trials ranged from 5 to 60 s in duration.

Task 14 – The participant reached into the tub and moved it forward by touching its hind legs with the back of his or her fingers. These trials ranged from 5 to 120 s in duration.

Task 15 – The participant placed the back of his or her hands on the floor of the tub, and the therapist moved the spider onto the participant's palms. These trials ranged from 5 to 120 s in duration.

Task 16 – The participant held the spider in his or her hands while the therapist stood next to him or her. These trials ranged from 5 to 120 s in duration.

Task 17 – The participant held the spider in his or her hands while the therapist stood nine feet away from him or her. This task consisted of one trial, 120 s in duration.

Prolonged Exposure Condition (PE). The PE condition proceeded in a similar fashion to the DE condition. Each of the 17 behavioral tasks in the DE condition were required by the PE condition, as well. However, there was no "dosing" of the exposures.

Instead, participants were expected to remain in the room and continue with each task until the treatment was completed.

Successful completion of a task was defined by the participant engaging in the required behavior for at least 120 s without emitting safety behaviors or behavioral indices of distress. After each task was successfully completed, the therapist showed the visual analog scales to the participant and recorded his or her subjective feelings of anxiety, danger, control, and mastery of the task. He also recorded the participant's heart rate and any occurrences of safety behaviors and indices of distress during the task. Each of these measures were recorded inside the exposure room.

Post-Treatment Session

Immediately after the treatment session, the BAT-1 was re-administered and the BAT-2 was then administered. Finally, the therapist escorted the participant back to the room where the diagnostic interview was held, and he or she re-completed the Animal Questionnaire and the Animal Fears Scale.

One-Week Follow-Up Session

This session took place seven to 14 days after the treatment session. During this session, the BAT-1, the BAT-2, the Animal Questionnaire, and the Animal Fears Scale was re-administered. In addition, the DEVS was completed by the participant as a measure of his or her satisfaction with the treatment.

Three-Month Follow-Up Session

This session took place at least 90 days after the treatment session, and it proceeded identically to the One-Week Follow-Up session.

CHAPTER VI

RESULTS

Mixed model analyses of variance (between-subjects × within-subjects split-plot ANOVA) were used to examine differences between the two treatments in regards to behavioral avoidance, anxiety, feelings of danger, feelings of control, and phobic cognitions across three time periods (immediately before, immediately after, and one week following the treatment session). Mixed model ANOVAs were also used to examine differences between the two treatments on measures of heart rate and emotional and cognitive states over the course of the individual treatment sessions. In addition, independent-samples t-tests and chi-square tests of independence were used to examine differences in post-treatment scores between the groups. All tests used significance levels of $\alpha = .05$.

Treatment Completion

Length of time to complete treatment differed between the Prolonged Exposure (PE) and Dosed Exposure (DE) conditions. The average duration of PE for Snake phobia was 2 hours and 32 minutes, while the average duration of DE was 3 hours and 48 minutes. Similarly, the average length of PE for Spider phobia was 3 hours and 5 minutes, whereas DE for Spider phobia averaged 3 hours and 46 minutes. Although the DE treatments required more total session time than either PE treatment, each participant receiving DE had a total of only 32 minutes in contact with feared stimuli. The rest of the session time was spent sitting outside of the room or preparing for exposure tasks (e.g., moving the animal into place). Conversely, each PE treatment session was spent

inside of the exposure room facing the feared animal, making the time each participant spent in contact with feared stimuli much longer (~2-3 hours).

The two treatments also differed significantly in dropout rates ($\chi^2 = 4.8$, $p = .028$). While all 12 individual receiving DE successfully completed each of the 17 treatment tasks, from first approaching the closed cage to holding the previously feared animal while the therapist stood nine feet away, only eight (67%) of the participants receiving PE were able to complete all tasks. Of those who were unable to complete the treatment, one dropped out during Task 12 (capturing the spider with a card and cup), one during Task 14 (touching the snake's belly), and two during Task 15 (spider crawling over pt's palm; pt. supporting the weight of the snake's belly), making the average number of tasks completed by participants receiving PE to be 16 (SD = 1.6).

Participants receiving DE also exhibited fewer difficulties complying with the treatment protocol. An average of 10% (SD = .1) of treatment tasks during PE were marked by hesitation from participants or attempts to negotiate with the therapist (e.g., "Can I just move one foot closer instead of three?"). In contrast, an average of only 1% (SD = .02) of DE treatment tasks were marked by these behaviors. Similarly, an average of 6% (SD = .05) of treatment tasks were re-completed by participants in the PE condition when they were unable to complete subsequent tasks. This occurred in less than 1% (SD = .05) of DE tasks.

Nonetheless, during the one-week follow-up session, 91.6% of participants who received PE (all but one participant) reported their anxiety in the presence of the animal had reduced by at least one third from the baseline assessment. This treatment response

rate is similar to numbers reported in other studies of PE (85-90%; Öst, 1989; Öst, Brandberg, et al., 1997).

Between-Session Changes

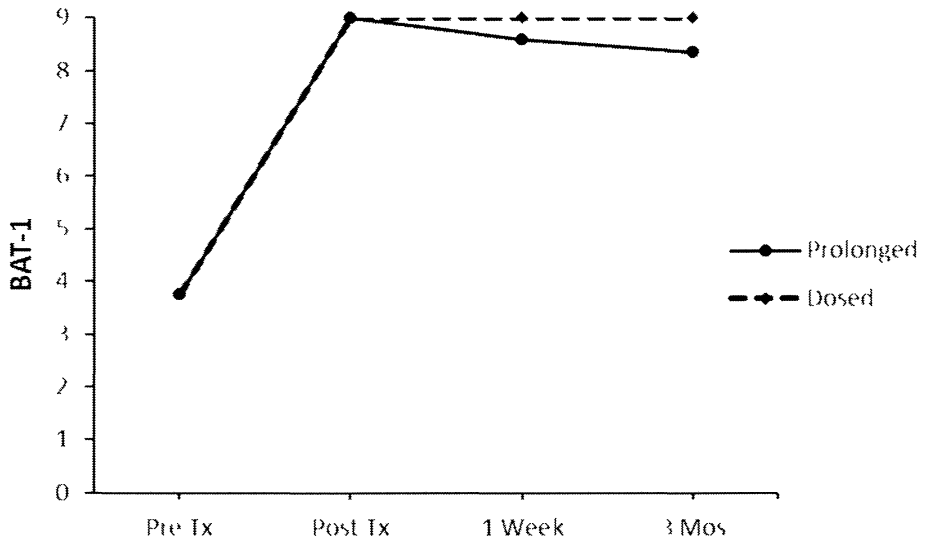
Behavioral Avoidance

A mixed model ANOVA was conducted to compare changes in the first Behavioral Avoidance Test (BAT-1) scores between groups across three time periods (Pre-Treatment, Post-Treatment, and One-Week Follow-up). There was no significant interaction between treatment and time (Wilks' Lambda = .93, F (2, 21) = .745, p = .487), but there was a substantial main effect for time (Wilks' Lambda = .084, F (2, 21) = 115, p = .0005, d = 6.60), with both groups showing an increase in approach behaviors over time. The main effect comparing the two treatments was not significant, however (F (1, 22) = .059, p = .81), suggesting no difference in the efficacy of the interventions on this measure. Due to scheduling difficulties and changes in contact information, only five participants receiving PE and two participants receiving DE were able to be assessed three months after the treatment session. Their results are included in the table below.

Table 1. Between-session changes in BAT-1 scores

	Prolonged Exposure			Dosed Exposure		
Time period	N	Mean	SD	N	Mean	SD
Pre-Treatment	12	3.75	1.5	12	3.75	1.7
Post-Treatment	12	9	0	12	9	0
1 Week Follow-up	12	8.6	1.1	12	9	0
3 Month Follow-up	5	8.2	1.6	2	9	0

Figure 1. Between-session changes in BAT-1 scores



The second Behavioral Avoidance Test (BAT-2) required the participant to hold the previously feared animal in his or her hands for as long as he or she felt comfortable (up to two minutes). Because four participants in the PE condition dropped out of treatment before Task #17, they did not complete the BAT-2. Of the participants who did complete the treatment, there were no significant differences found regarding how long they were able to hold the animal immediately following the treatment or during the one-week follow-up assessment ($F(1, 17) = .716, p = .409$.

Table 2. Between-session changes in BAT-2 scores

	Prolonged Exposure			Dosed Exposure		
Time period	N	Mean (s)	SD	N	Mean (s)	SD
Post-Treatment	8	120	0	12	120	0
1 Week Follow-up	8	120	0	12	114	20
3 Month Follow-up	5	108	24	2	120	0

Subjective Measures

In addition, a series of mixed model ANOVAs were conducted to compare changes in each participant's self-reported feelings of anxiety, danger, and control following the BAT-1. There were significant main effects for time, with both treatments producing substantial reductions in anxiety (Wilks' Lambda = .186, F(2, 21) = 46.06, p = .0005, d = 4.18) and perceptions of threat (Wilks' Lambda = .272, F(2,21) = 28.11, p = .0005, d = 3.27), and both treatments increased participants' feelings of control over their environment (Wilks' Lambda = .29, F(2, 21) = 25.7, p = .0005, d = 3.13). However, the main effect comparing the two interventions was not significant for changes in anxiety (F (1, 22) = 1.37, p = .256), danger (F (1, 22) = .424, p = .521), or control (F (1, 22) = 2.06, p = .165).

Figure 2. Between-session changes in subjective anxiety

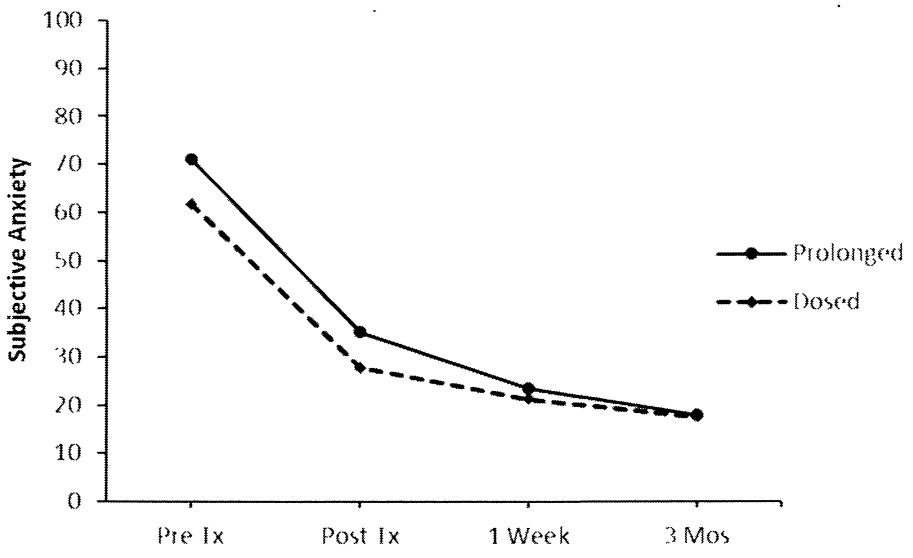


Figure 3. Between-session changes in feelings of danger

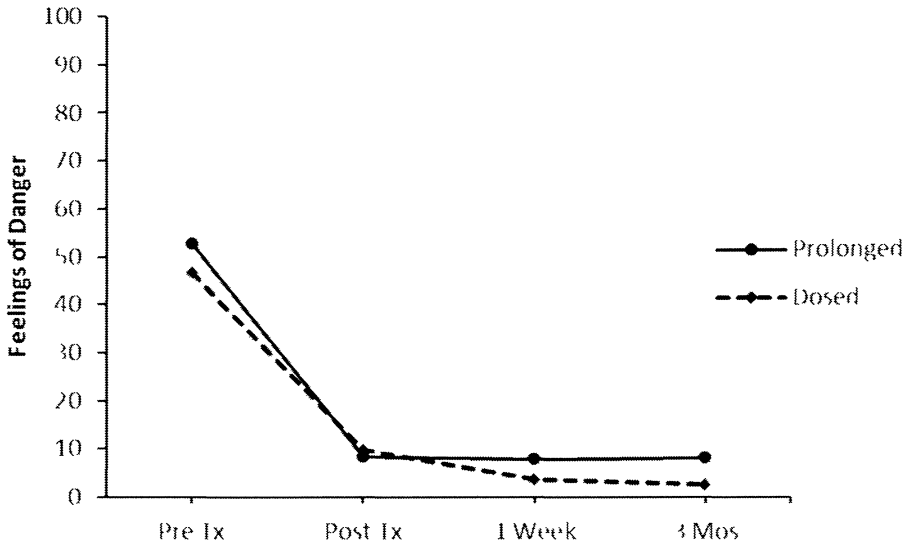
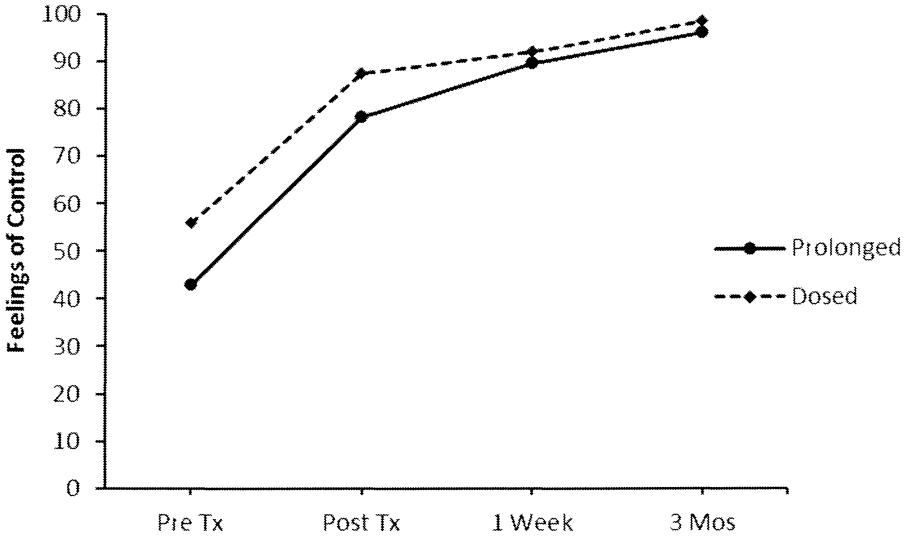


Figure 4. Between-session changes in feelings of control



Paper-and-Pencil Measures

Changes in phobic cognitions across the three time periods were measured using the Animal Questionnaires and the Animal Fear Scales. Pre-treatment scores on the

Snake Questionnaire were similar between treatment conditions, and they were also similar to scores of other snake phobics reported by other researchers (M = 24.44, SD = 2.95; Fredrikson, 1983; see table below). Likewise, pre-treatment scores on the Spider Questionnaire were similar between treatment conditions and similar to scores of other spider phobics (M = 23.76, SD = 3.8; Fredrikson, 1983). Although scores on these questionnaires did significantly change over time (Wilks' Lambda = .096, F(2, 21) = 98.95, p = .0005, d = 6.14), there was not a significant difference in these changes between the two treatment conditions (F (1, 22) = 1.65, p = .212).

The Snake and Spider Fears Scales demonstrated similar changes in phobic cognitions from pretreatment to post-treatment (Wilks' Lambda = .108, F(2, 21) = 86.97, p = .0005, d = 5.75). However, like the scores on the Animal Questionnaires, there were no significant differences between groups on the Animal Fear Scales (F (1, 22) = .303, p = .588).

Table 3. Between-session changes in phobia measures

	Pre Tx	Post Tx	1 Week	Total Reduction in Symptoms
Prolonged Exposures				
Snake Questionnaire	21.0 (2.8)	7.3 (1.6)	9.8 (2.6)	52%
Snake Fears Scale	46.5 (7.1)	14.0 (9.0)	15.7 (8.8)	66%
Spider Questionnaire	21.0 (2.0)	11.3 (5.0)	11.5 (5.0)	46%
Spider Fears Scale	43.3 (4.3)	19.7 (14.9)	21.8 (13.1)	49%
Dosed Exposures				
Snake Questionnaire	22.0 (3.1)	8.0 (3.9)	6.0 (0)	61%
Snake Fears Scale	50.3 (11.8)	13.3 (11.5)	14.0 (11.5)	76%
Spider Questionnaire	18.9 (3.9)	7.5 (3.6)	7.9 (3.8)	60%
Spider Fears Scale	47.9 (4.8)	15.4 (7.1)	10.8 (5.1)	77%

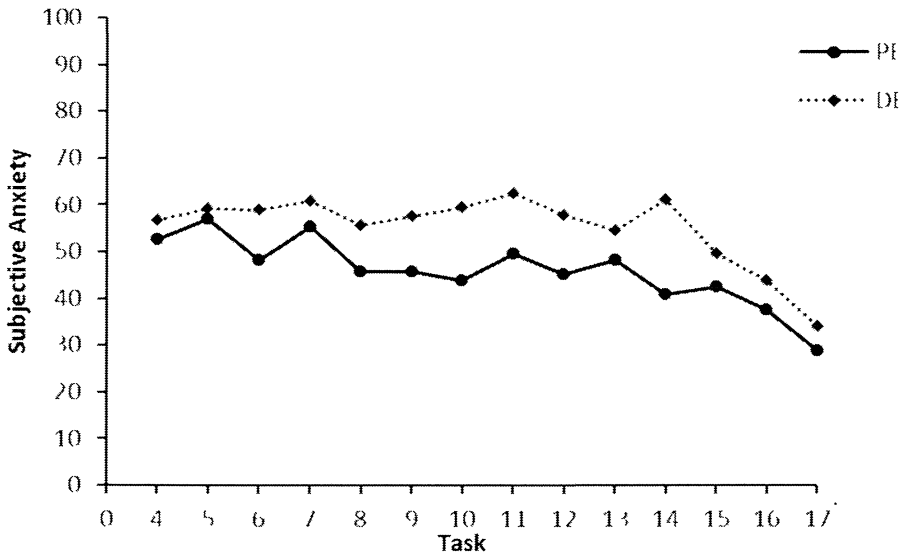
Within-Session Changes

To examine the emotional and cognitive changes taking place during the treatment, each participant was asked to rate his or her feelings of anxiety, danger, control, and self-efficacy at the end of each exposure task, and a mixed model ANOVA was used to test for differences between treatment conditions. This method of analysis was also used to examine within-session differences in heart rate between the treatments. Because only 54% of participants (7 PE participants; 6 DE participants) completed at least one of the first three tasks, only Tasks 4-17 were analyzed with respect to in-session changes.

Anxiety (SUDS)

There was no significant interaction between the two treatments over time on self-reports of anxiety (Wilks' Lambda = .518, $F(13, 6) = .429$, $p = .905$), and, although there was a downward trend in anxiety across both treatments, there was not a significant main effect for time (Wilks' Lambda = .15, $F(13, 6) = 2.62$, $p = .122$). There was a significant difference between the two treatments, however, with the dosed exposure condition incurring greater feelings of anxiety across time compared to prolonged exposures ($F(1, 18) = 5.66$, $p = .029$). The magnitude of this difference was large ($d = 1.12$).

Figure 5. Within-session changes in subjective anxiety



Other Self-Reported Data

A downward trend was observed in feelings of danger over time; however, there was not a significant main effect for time (Wilks' Lambda = .162, F(13, 6) = 2.40, p = .145). Similarly, there were no main effects for time with respect to self-reported feelings of control (Wilks' Lambda = .198, F(13, 6) = 1.87, p = .228) and self-efficacy (Wilks' Lambda = .402, F(13, 6) = 1.87, p = .734). In addition, no significant differences were detected between treatments on feelings of danger (F (1, 18) = 2.79, p = .112), control (F (1, 18) = .068, p = .797), and self-efficacy (F (1, 18) = 1.11, p = .306).

Figure 6. Within-session changes in feelings of danger

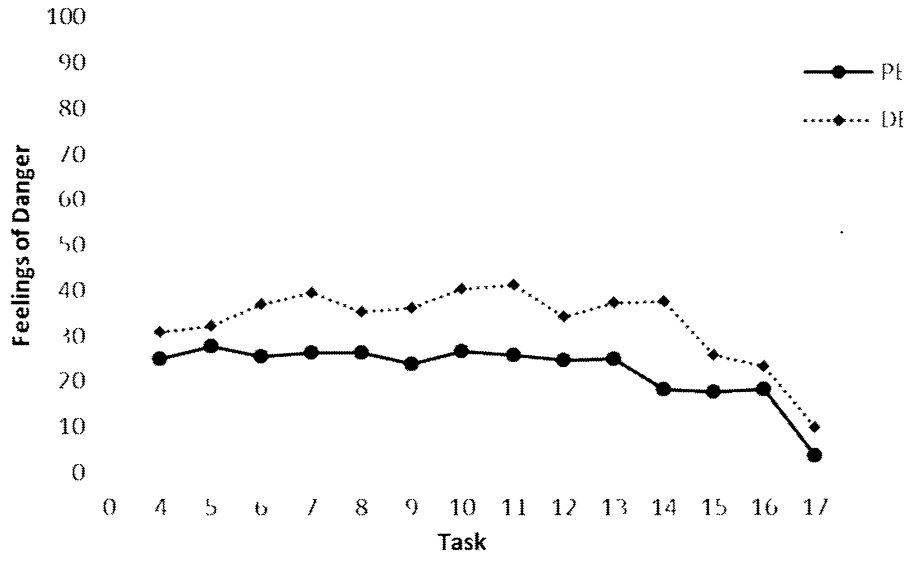


Figure 7. Within-session changes in feelings of control

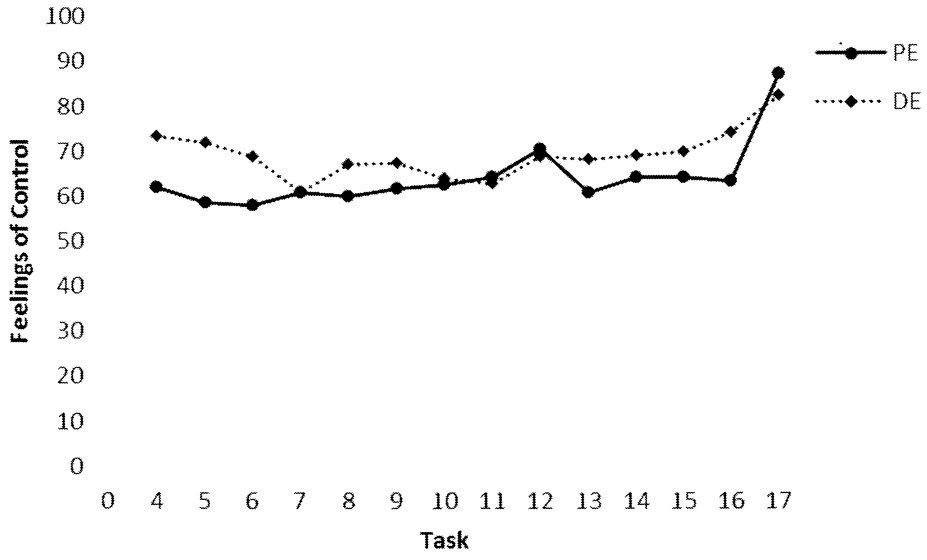
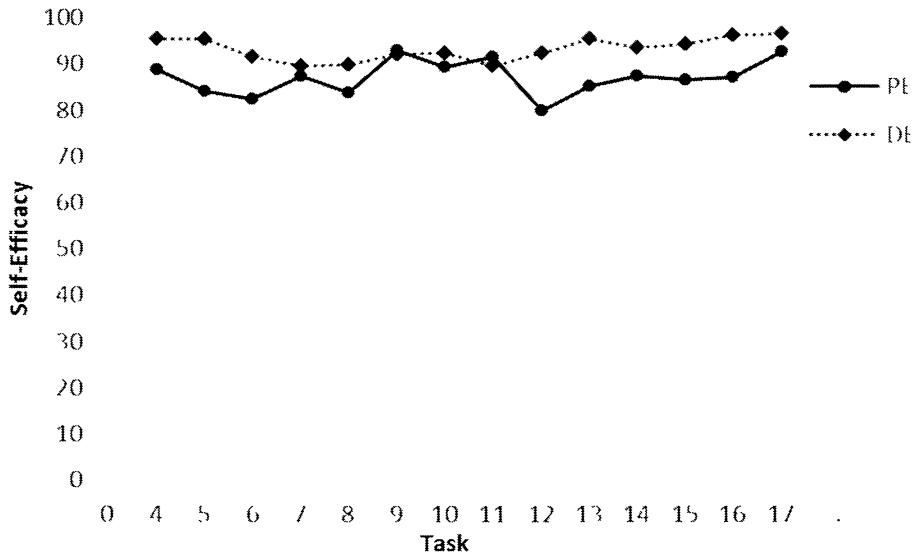


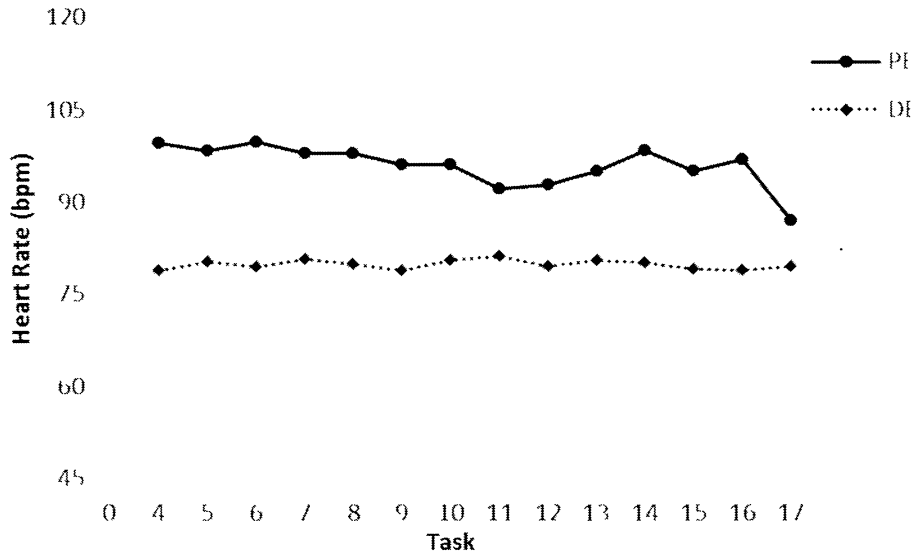
Figure 8. Within-session changes in self-efficacy



Heart Rate

There was no significant interaction between treatment and time with respect to heart rate (Wilks' Lambda = .256, F(13, 5) = 1.18, p = .488), and the main effect for time was not significant (Wilks' Lambda = .284, F(13, 5) = .972, p = .559). However, while the PE condition incurred less anxiety during the course of treatment, participants in this group had substantially greater heart rates during the treatment than participants in the DE group (F (1, 17) = .588, p = .027) with a large effect size (d = 1.18).

Figure 9. Within-session changes in heart rate



Treatment Acceptability

Safety Behaviors

Rates of safety behaviors differed substantially between treatment conditions. An average of 35% of the tasks during the Prolonged Exposure treatment were marked by at least one safety behavior, while participants in the Dosed Exposure group exhibited these behaviors during only 7% of the tasks. Results of an independent samples t-test confirmed that the difference in the amount of safety behaviors exhibited between the two groups (PE: M = 4.8, SD = 2.9; DE: M = 1.1; SD = 1.4) was significant ($t(15.6) = 3.83$, $p = .002$), and the magnitude of the difference (mean difference = 3.75, 95% CI: 1.67 to 5.83) was large (d = 1.63).

Behavioral Indices of Distress

Any occurrences of crying, watery eyes, and visible shaking were recorded by the therapist as a behavioral index of distress. Although these indices were observed in 22% of PE tasks (M = 3.2 per participant, SD = 2.9) versus 10% of DE tasks (M = 1.7, SD = 2.4), these differences were not significant ($t(22) = 1.32$, $p = .20$). In addition to the three behavioral indices of distress specifically measured, two unique indices of distress were noted from participants in the PE condition, with one participant fainting during the treatment (Task #6) and another screaming and temporarily leaving the room (Task #3).

DEVS

The Distress/Endorsement Validation Scales (DEVS) was used to assess participants' satisfaction with treatment during the one-week follow-up assessment. The mean ratings on the Distress subscale were 35.4 (SD = 10.6) for PE and 30.0 (SD = 8.8) for DE. These ratings were similar to average ratings of treatment-related distress reported by Devilly (2004) from patients receiving either CBT (32.50), EMDR (31.18), or intensive counseling (30.31) for posttraumatic stress. The mean ratings on the Endorsement subscale were 21.2 (SD = 3.6) for PE and 23.7 (SD = 3.6) for DE. These ratings were similar to treatment satisfaction ratings from patients receiving intensive counseling for posttraumatic stress (22.4). The two treatment conditions did not differ significantly on either the Distress ($t(22) = 1.31$, $p = .205$) or the Endorsement ($t(22) = -1.63$, $p = .117$) subscales.

Treatment Integrity

Independent assessors reviewed 50% of the treatment sessions via digital video. Results showed that, in 100% of the cases viewed, the therapist administered the intervention according to protocol, the tasks were presented in the correct sequence, and no exercises were added to the treatment. In addition, each exposure trial in the DE condition was timed by the assessors, and a very strong correlation was found between the prescribed trial durations and the actual durations ($r = .969$, $p < .0005$). A further analysis of treatment integrity was conducted by scoring individual exposure trial durations as delivered 'correctly' or 'incorrectly.' Durations between 5 and 30 seconds in length were allowed to vary by ±10 seconds and durations between 60 and 120 seconds in length were allowed to vary by ±20 seconds. Based on these criteria, only 2.9% of trial durations were administered differently from the prescribed duration, and it is important to note that no trial lasted longer than 141 seconds. Thus, it can be concluded that exposures in the DE condition were, indeed, delivered in brief "doses."

CHAPTER VII

DISCUSSION

This study compared two one-session behavioral treatments for specific animal phobias: a well-studied treatment that subjected clients to prolonged periods of exposure to fearful stimuli ("prolonged exposures"), and an experimental treatment that utilized a massed series of exposures lasting 5 to 120 seconds in length ("dosed exposures"). The results showed that the prolonged exposure treatment was conducted accurately and with fidelity, and the treatment gains produced were similar to those of other studies on this intervention (cf. Zlomke & Davis, 2008).

Contrary to the widespread belief that continuous contact with feared stimuli is necessary in the treatment of anxiety and that brief exposures could hinder the effects of treatment or even exacerbate a client's anxiety, this study found that, under the right circumstances, brief exposures could produce both statistically significant and clinically meaningful results. Dosed exposure therapy performed equally well to prolonged exposures at decreasing behavioral avoidance, feelings of anxiety, perceptions of threat, and phobia-specific cognitions from pretreatment to post-treatment, and these gains were maintained at one-week and three-month follow-ups. During these follow-up sessions, participants from the two groups reported equal degrees of distress experienced during treatment and equivalent ratings of satisfaction with treatment gains. In addition, while the Dosed Exposure treatments required participants to spend less time in contact with feared stimuli, these treatments produced higher rates of treatment completion, better compliance from participants, and fewer safety behaviors, on average. Dosed exposures were also less likely to produce elevations in heart rate from participants. Despite these

findings, the Prolonged Exposure treatment carried two advantages over its counterpart. Namely, it required less total session time to administer, and participants reported lower within-session SUDS ratings, on average.

Evaluation of Hypotheses

Four hypotheses were proposed before this study commenced. Hypothesis #1 stated that dosed exposures would produce equivalent reductions in anxiety at post-treatment as prolonged exposures. This hypothesis was supported by the data. Behavioral tests, verbal reports of subjective feelings of anxiety, danger, and control, and standardized paper-and-pencil measures all showed that prolonged and dosed exposures produced equal reductions in anxiety.

Hypothesis #2 stated that average total treatment time for dosed exposure therapy would be within one hour of the average total treatment time for prolonged exposure therapy. This hypothesis was only partially supported by the data. While the Dosed Exposure treatment for spider phobia took 41 minutes longer than the Prolonged Exposure treatment, Dosed Exposure for snake phobia took 76 minutes longer than Prolonged Exposure. While participants receiving either of the Dosed Exposure treatments received less time in contact with the feared animal, the numerous inter-trial break periods outside of the room coupled with the time required to repeatedly move the snake and spiders during each exposure trial led to longer total session times.

Hypothesis #3 stated that participants receiving dosed exposures would be less likely to engage in safety behaviors during the session than participants receiving prolonged exposures. This hypothesis was supported by the data, showing a statistically significant difference between the two treatments with a large effect size.

Hypothesis #4 stated that participants receiving dosed exposures would find treatment less aversive than participants receiving prolonged exposures. This hypothesis was not supported by the data. While participants in the Dosed Exposure group engaged in fewer safety behaviors and had lower heart rates than participants in the Prolonged Exposure group, there were no significant differences in behavioral indices of distress or one-week follow-up ratings of treatment distress and treatment satisfaction. In addition, participants in the Prolonged Exposure group reported lower ratings of subjective anxiety during the treatment than participants receiving Dosed Exposure.

Limitations

In spite of the interesting findings of this study – many of which run contrary to existing beliefs about therapy – this study did have some significant limitations. Foremost was the relatively small size of the samples used. While some significant differences were found between the two groups and the study used sample sizes similar to those of other studies of animal phobia treatments (mean N = 12.8 across studies, as reported by Zlomke & Davis, 2008), it is possible that a larger sample size may have helped detect other differences between the treatments.

Another limitation is the lack of long-term follow-up data. Only 29% of participants were able to be contacted and scheduled for a three-month follow-up assessment, and even longer follow-up data (1 year or more) may have supported a widespread implementation of dosed exposure therapy. However, the objective of this study was not to study the long term effectiveness of either of the treatments, but to examine whether a massed series of brief exposure trials would hinder the process and post-treatment outcomes of exposure therapy.

A final limitation pertains to the high degree of structure used in the study. All treatments were conducted in a small, windowless room with clear floor markers designating where to stand, and outside the room was a small quiet area for inter-trial break periods. Such settings are unlikely to be found in most outpatient clinics. Moreover, both treatment protocols were highly regimented, allowing for no flexibility on the part of the therapist. It is unlikely that moving forward three feet at a time makes much of a difference from moving two or four feet, and it is unlikely that exposure trials lasting no longer than 120 seconds are significantly different from those lasting 220 seconds. In outpatient settings, these two treatments may proceed differently. However, such rigid measures were required to reduce confounding effects from the individual therapist or the therapy setting and to promote isolation of the variables under examination.

Implications

The results of this experiment along with some of the previously cited studies suggest that the notion that uninterrupted exposures are crucial to the reduction of anxiety needs to be abandoned. In the case of specific animal phobias, dosed exposures can produce treatment gains that are not only clinically significant, but similar to those achieved with the gold standard intervention. In addition, these treatments require less total time in contact with conditioned fear stimuli, a finding that is antithetical to earlier theories of fear extinction (e.g., Foa & Kozak, 1986). Further analyses are now warranted to clarify why this approach works.

It is clear that uncontrolled escape behaviors will negatively impact treatment (Powers et al., 2004). Therefore, some element of response prevention is required during

any exposure-based intervention, whether it be client-directed or therapist-directed. Research also suggests that, in order for brief exposures to be effective, they must be delivered multiple times in a massed fashion (versus one or two brief exposure trials before quitting).

It is also possible that the facilitation of approach behaviors is a critical component of exposure therapy (Rentz et al., 2003). While simple habituation models suggest that mere contact with feared stimuli over time will reduce anxiety, neither treatment employed in the current study allowed for passive participation from individuals. Instead, both treatments required participants to engage in actions that were in opposition to typical fear responses.

The high volume of approach trials required from participants in the DE group may have contributed to the lower rates of dropout from this treatment. For example, while one participant in the PE condition sailed through the first 11 treatment tasks, when it came to placing her hands near the spider, she was steadfastly unwilling. This participant spent more time in contact with the animal than participants in the DE group. However, she had engaged in only 11 approach behaviors versus the 42 trials completed by DE participants by that stage of treatment.

It is also likely that the very brief periods of time in contact with feared stimuli affected the way the treatment was experienced. For example, during the last two tasks, which required participants to hold the previously feared animal in their hands, participants in the PE group were more likely to report feelings of exhaustion or remark that they had earned their accomplishment. On the other hand, participants receiving DE often reported feelings of confusion or stated, "I can't believe I'm doing this."

Unfortunately, the hope that dosed exposures would offer a less aversive alternative to prolonged exposures was not supported by the data, as participants in the DE group had higher SUDS ratings, on average. However, this study demonstrates that verbal reports of one's internal experiences are poor predictors of actual behaviors, as there was no relation between SUDS scores and rates of treatment completion.

Summary

In conclusion, this study shows that, contrary to popular belief, brief exposure trials can be effective in the treatment of anxiety, leading to reductions in behavioral avoidance, feelings of anxiety, perceptions of threat, and phobia-specific cognitions that are equivalent to a well-established treatment. Because the dosed exposure approach produced fewer in-session safety behaviors and lower dropout rates, it may eventually prove to be a viable alternative to traditional, prolonged exposures. However, more research using this approach with a wider array of anxiety disorders is needed.

CHAPTER VIII

HUMAN SUBJECTS PROTECTION

Prior to any screening, measurement, or treatment, each participant read and signed an informed consent document (Appendix F) which described the procedures used in the study, the time commitment required of participants, and the right of the participant to withdraw from the study at anytime without prejudice or penalty. The document also outlined the risks, benefits, and protections for participants in the study. In addition, the informed consent document included the names and phone numbers of the principal investigator, the student investigator, the Chair of the WMU Human Subjects Institutional Review Board, and the Vice President of Research, and it informed the participants that they could contact any of these individuals during or after the course of the study should any questions or concerns about the study arise.

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Appendix A – HSIRB Approval Document

WESTERN MICHIGAN UNIVERSITY

Human Subjects Institutional Review Board

Date: May 12, 2009

To: Richard Spates, Principal Investigator
Richard Seim, Student Investigator for dissertation

From: Amy Naugle, Ph.D., Chair

Re: HSIRB Project Number: 09-04-03

This letter will serve as confirmation that your research project titled "One-Session Treatments for Animal Phobias" has been **approved** under the **full** category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may **only** conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: April 15, 2010

Walwood Hall, Kalamazoo, MI 49008-5456
PHONE: (269) 387-8293 FAX: (269) 387-8276

Appendix B – IACUC Approval Document

WESTERN MICHIGAN UNIVERSITY

Institutional Animal Care and Use Committee

Centennial 1903-2003 Celebration

Date: March 24, 2010

To: C. Richard Spates, Principal Investigator

From: Robert Eversole, Chair

Re: IACUC Protocol No. 10-02-02

Your protocol titled "Dosed Stimulus Therapy for Small Animal Phobias 2" has received approval from the Institutional Animal Care and Use Committee. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: March 24, 2011

Walwood Hall, Kalamazoo, MI 49008-5456
PHONE (269) 387-8293 FAX (269) 387-8276

Appendix C – Recruitment Script

Recruitment Script

Principal Investigator: C. Richard Spates, Ph.D.
Student Investigator: Richard W. Seim, M.A.
Title of Study: One-Session Treatments for Animal Phobias

- Are you afraid of spiders? Are you afraid of snakes? If so, you are invited to participate in a research study entitled "One-Session Treatments for Animal Phobias."

- This study is being conducted by Dr. Richard Spates and Richard Seim from the WMU Department of Psychology

- There are two well-supported treatments for snake and spider phobias. This study will directly compare the effects and benefits of these two treatments.

- If you choose to participate in this study, you will be invited to attend one treatment session which will take no longer than five hours to complete

- You will also be asked to attend two 15 minute follow-up sessions

- Risks involve experiencing emotional discomfort during the treatment and follow-up sessions

- One way in which you may benefit from participating in this study is to eliminate your fear of snakes or spiders. Treatments of this type have been shown to be very effective at eliminating the phobias of other individuals. Also, other people with small animal phobias may benefit from the knowledge that is gained from your participation in this research.

- If you are interested in learning more about participating in this study, please contact the researchers by phone at the contact information on the slips of paper I will hand out.

- Thank you

Appendix D – Snake Flyer

ARE YOU
AFRAID OF
SNAKES?

The WMU Anxiety Disorders Lab is recruiting individuals to participate in a study investigating treatments for Snake Phobias.

This study asks individuals to participate in one treatment session and two follow-up measurement sessions

If you are interested in learning more, please contact Richard Seim at 269-387-4332

Sponsored by the WMU Dept. of Psychology

Snake Phobia Treatment Study
269-387-4332 ext.1
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Appendix E – Spider Flyer

ARE YOU
AFRAID OF SPIDERS?

The WMU Anxiety Disorders Lab is recruiting individuals to participate in a study investigating treatments for Spider Phobias.

This study asks individuals to participate in one treatment session and two follow-up measurement sessions

If you are interested in learning more, please contact Richard Seim at 269-387-4332

Sponsored by the WMU Dept. of Psychology

Spider Phobia Treatment Study
269-387-4332 ext.1

Appendix F – Informed Consent Form

WESTERN MICHIGAN UNIVERSITY
H. S. I. R. B.
Approved for use for one year from this date:
APR 15 2009
HSIRB Chair

Western Michigan University
Department of Psychology

Principal Investigator: C. Richard Spates, Ph.D.
Student Investigator: Richard W. Seim, M.A.
Title of Study: One-Session Treatments for Animal Phobias

You have been invited to participate in a research project titled "One-Session Treatments for Animal Phobias. This project will serve as Richard Seim's dissertation for the requirements of the Ph.D. degree. This consent document will explain the purpose of this study and will go over all of the time commitments, the procedures used in the study, and the risks and benefits of participating in this research project. Please read this consent form carefully and completely and please ask any questions if you need more clarification.

What are we trying to find out in this study?
There are two well-supported treatments for snake and spider phobias. This study will directly compare the effects and benefits of these two treatments.

Who can participate in this study?
Adults between the ages of 18 and 60 can participate in this study. Participants must have a significant fear of either snakes or spiders. Individuals who have a history of heart problems and individuals who have problems standing, walking, or moving quickly should not participate in this study. Also, individuals who are under the influence of a substance or who have started taking medication or have changed their dosages for a medication for a psychiatric condition within the last 30 days should not participate in this study.

Where will this study take place?
This study will take place in the therapy rooms in the 2500 Suite of Wood Hall.

What is the time commitment for participating in this study?
This study will involve one treatment session, which will take no more than five hours to complete. It will also involve two 15 minute follow-up sessions. These will occur one week and three months after the treatment session.

What will you be asked to do if you choose to participate in this study?
If you choose to participate in this study, you will be asked to answer questions about your fear of snakes or spiders and complete several questionnaires about the nature of your fear. You will also be asked to complete a Behavioral Avoidance Test, which will consist of you attempting to stand as close to a feared animal as you are comfortable with for a brief period. During the treatment, the therapist will assist you in gradually approaching a feared animal. You will also be regularly asked to rate you anxiety, your sense of danger, and your feelings of control during

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APR 15 2009
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HSIRB Chair

the treatment. After the treatment you will be asked to complete more questionnaires and to re-complete the Behavioral Avoidance Test. You will also be asked to attend two 15 minute follow-up sessions after the treatment. During these sessions, you will be asked to complete three questionnaires and to complete the Behavioral Avoidance Test again.

What information is being measured during the study?
Several measures of anxiety will be recorded during this study including your self-reported feelings of anxiety, your responses on five questionnaires, and your heart rate. If you choose to participate in this study, parts of the treatment session will be videotaped. These recordings will be stored in a locked file cabinet in 2523 Wood Hall, and they will only be accessible to the researchers. After five years, the video recordings will be destroyed.

What are the risks of participating in this study and how will these risks be minimized?
As in all research, there may be unforeseen risks to the participant. If an accidental injury occurs, appropriate emergency measures will be taken; however, no compensation or treatment will be made available to you except as otherwise specified in this consent form. One potential risk of participation in this project is that you may be emotionally upset in the presence of the feared animal (during the Behavioral Avoidance Test and treatment). However, Richard Seim and the trained therapists involved in this project are prepared to terminate the treatment session and provide crisis counseling if you become significantly upset. Furthermore, they are prepared to make a referral if you need further counseling on this topic. You will be responsible for the cost of therapy if you choose to pursue it. There is a small risk of being harmed by the animal. If you receive a bite from the animal, the therapists will offer immediate first aid treatment and refer you to emergency medical personnel for further evaluation. You will be responsible for any medical costs from this evaluation.

What are the benefits of participating in this study?
One way in which you may benefit from participating in this study is to eliminate your fear of snakes or spiders. Treatments of this type have been shown to be very effective at eliminating the phobias of other individuals. Also, other people with small animal phobias may benefit from the knowledge that is gained from your participation in this research.

Are there any costs associated with participating in this study?
There are no costs associated with participating in this study.

Is there any compensation for participating in this study?
No compensation will be given for participating in this study.

Who will have access to the information collected during this study?
All of the information collected from you is confidential. This means that your name will not appear on any papers on which this information is recorded. The forms will all be coded, and

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H. S. I. R. B.
Approved for use for one year from this date:
APR 15 2009
x _____
HSIRB Chair

Richard Seim will keep a separate master list with the names of participants and the corresponding code numbers in a locked file cabinet. Once the data are collected and analyzed, the master list will be destroyed. All other forms will be retained for at least three years in a locked file cabinet in the WMU Anxiety Disorders Laboratory.

What if you want to stop participating in this study?
You can choose to stop participating in the study at anytime for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You will experience NO consequences either academically or personally if you choose to withdraw from this study. The investigator may also decide to stop your participation in the study without your consent.

Should you have any questions prior to or during the study, you can contact the primary investigator, C. Richard Spates at 269-387-4329 or a crspates@aol.com. You may also contact the Chair of the Human Subjects Institutional Review Board at 269-387-8293 or the Vice President for Research at 269-387-8298 if questions arise during the course of the study.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

I have read this informed consent document. The risks and benefits have been explained to me. I agree to take part in this study.

_____
Please Print Your Name

_____ _____
Please Sign Your Name Date

Appendix G – Exclusionary Criteria Form

Can you answer 'yes' to any of the following questions?

- Are you younger than 18-years-old?
- Do you have a history of heart problems?
- Do you have troubles standing, walking, or moving quickly?
- Have you started taking a medication for a psychiatric condition within the past 30 days?
- Have you changed dosages of a medication for a psychiatric condition within the past 30 days?

Appendix H – Counseling Referral Sites

Local Counseling and Therapy Centers

WMU Psychology Clinic
1000 Oakland Drive
3rd Floor
Kalamazoo, MI 49008

#269-387-8302

Center for Counseling and Psychological Services
3109 Sangren Hall
Kalamazoo, MI 49008

#269-387-5105

University Counseling and Testing Center
2513 Faunce Student Services Building
Kalamazoo, MI 49008

#269-387-1850

Appendix I – Participant Demographics Form

Participant # _____

Please answer the following questions as best as you can.

Age: _____

Gender (circle one): □ Male □ Female

Background: □ African American □ Asian/Pacific Islander □ Caucasian/White
□ Hispanic/Latino □ Native American □ Other

What small animal fear are you seeking treatment for? (circle one)

Spiders Snakes

How many times in your life have you encountered this animal outdoors? _____

How many times in your life have you encountered this animal indoors? _____

How long ago did you last encounter this animal in real life, such as in a cage, in a building, or in the wild? _____

Have you had this fear for over 6 months? (circle one) Yes No

If yes, for how long? _____

Please indicate the main type of area you lived in during these ages in your life:

	Rural Area or Countryside	Small Town	Suburban Area or City Outskirts	Inner City Area or Downtown
Ages 1-5	☐	☐	☐	☐
Ages 6-10	☐	☐	☐	☐
Ages 11-15	☐	☐	☐	☐
Ages 15-20	☐	☐	☐	☐
Present age	☐	☐	☐	☐

Please answer the following questions about common fears using this scale:

0 = none 1 = mild 2 = moderate 3 = significant 4 = severe

	How great is your fear? (0-4)	How much do you avoid this? (0-4)	Does this fear prevent you from doing things you would otherwise do?
Snakes	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Rats	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Spiders	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Dogs	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Cats	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Birds	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Cockroaches	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Flying insects	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Heights	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Crayons	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Seeing blood	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Getting an injection	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Dental exams	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Tight enclosed spaces	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Elevators	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Vomiting	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Seeing someone vomit	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Public speaking	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Riding in a car	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Air travel	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
The dark	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Bridges	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Deep water	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Clowns	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn t Prevent
Thunderstorms	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Choking on food	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Catching an illness	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Gaining weight	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Evil spirits	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Meeting new people	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent
Walking through crowds	0 1 2 3 4	0 1 2 3 4	Prevents / Doesn't Prevent

Please rate your expected success for treatment on a 1 – 10 scale _____

(1 = little success,
10 = much success)

Appendix J – Snake Fears Scale

Participant # _____

Snake Fears Scale

Please place a mark (X) in the space corresponding to your level of severity for each item. Use the following scale to evaluate each item:

0 = None
1 = Mild
2 = Moderate
3 = Significant
4 = Severe

	0	1	2	3	4
1. Fear of being in a room with a snake when alone	____	____	____	____	____
2. Fear of being in a room with a snake when other people are present	____	____	____	____	____
3. Fear of seeing pictures or videos of a snake	____	____	____	____	____
4. Fear of touching a snake with my fingers	____	____	____	____	____
5. Fear of holding a snake in my hands	____	____	____	____	____
6. Fear of angering or frightening a snake	____	____	____	____	____
7. Fear of a snake biting me	____	____	____	____	____
8. Fear of a snake getting loose and crawling underneath my clothes	____	____	____	____	____
9. Fear of a snake leaping towards me	____	____	____	____	____
10. Fear of a snake chasing me	____	____	____	____	____
11. Fear of a snake making a noise	____	____	____	____	____
12. Avoidance of places where I might see a snake	____	____	____	____	____
13. Avoidance of places where a snake might have been in the past	____	____	____	____	____
14. How much distress do you experience due to a fear of snakes?	____	____	____	____	____
15. How significantly does a fear of snakes interfere with or impair your life?	____	____	____	____	____

Appendix K – Spider Fears Scale

Participant # _____

Spider Fears Scale

Please place a mark (X) in the space corresponding to your level of severity for each item. Use the following scale to evaluate each item:

0 = None
1 = Mild
2 = Moderate
3 = Significant
4 = Severe

	0	1	2	3	4
1. Fear of being in a room with a spider when alone	____	____	____	____	____
2. Fear of being in a room with a spider when other people are present	____	____	____	____	____
3. Fear of seeing pictures or videos of a spider	____	____	____	____	____
4. Fear of touching a spider with my fingers	____	____	____	____	____
5. Fear of holding a spider in my hands	____	____	____	____	____
6. Fear of angering or frightening a spider	____	____	____	____	____
7. Fear of a spider biting me	____	____	____	____	____
8. Fear of a spider getting loose and crawling underneath my clothes	____	____	____	____	____
9. Fear of a spider leaping towards me	____	____	____	____	____
10. Fear of a spider chasing me	____	____	____	____	____
11. Fear of a spider making a noise	____	____	____	____	____
12. Avoidance of places where I might see a spider	____	____	____	____	____
13. Avoidance of places where a spider might have been in the past	____	____	____	____	____
14. How much distress do you experience due to a fear of spiders?	____	____	____	____	____
15. How significantly does a fear of spiders interfere with or impair your life?.	____	____	____	____	____

Appendix L – Snake Treatment Tasks

Snake Treatment Tasks

Approaching the Cage (with 5, 10, 15, and 30 sec durations)

1. Standing 12' away from the cage
2. Standing 9' away from the cage
3. Standing 6' away from the cage
4. Standing 3' away from the cage
5. Standing in front of the cage

Touching the Cage (with 5, 10, 15, 30 and 60 sec durations)

6. Touching the outside of the cage
7. Touching the rim of the cage
8. Touching the inside wall of the cage

Approaching the Tub (with 5, 10, 15, and 30 sec durations)

9. Standing 3' away from the tub
10. Standing in front of the tub
11. Touching the therapist's hand while he touches the snake

Approaching the Animal (with 5, 10, 15, 30, and 60 sec durations)

12. Touching the snake
13. Petting the snake's back

Learning to Hold the Animal (with 5, 10, 15, 30, 60, and 120 sec durations)

14. Touching the snake's belly
15. Supporting the weight of the snake's belly
16. Holding the snake with the therapist nearby

Holding the Animal by Oneself (with one 120 sec duration)

17. Holding the snake with the therapist standing 9' away

*All treatment tasks were the same for the PE treatment

Appendix M – Spider Treatment Tasks

Spider Treatment Tasks

Approaching the Cage (with 5, 10, 15, and 30 sec durations)

1. Standing 12' away from the cage
2. Standing 9' away from the cage
3. Standing 6' away from the cage
4. Standing 3' away from the cage
5. Standing in front of the cage

Touching the Cage (with 5, 10, 15, 30 and 60 sec durations)

6. Touching the outside of the cage
7. Touching the rim of the cage
8. Touching the inside wall of the cage

Approaching the Tub (with 5, 10, 15, and 30 sec durations)

9. Standing 3' away from the tub
10. Standing in front of the tub
11. Moving the spider with a card

Approaching the Animal (with 5, 10, 15, 30, and 60 sec durations)

12. Capturing the spider with the card and cup
13. Touching the therapist's hand while he moves the spider with his hand

Learning to Hold the Animal (with 5, 10, 15, 30, 60, and 120 sec durations)

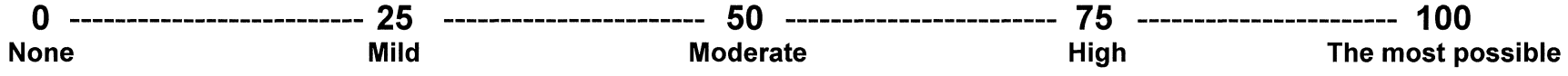
14. Moving the spider with the participant's hand
15. Having the spider stand on the participant's palms
16. Holding the spider with the therapist nearby

Holding the Animal by Oneself (with one 120 sec duration)

17. Holding the spider with the therapist standing 9' away

*All treatment tasks were the same for the PE treatment

Appendix N – Severity VAS


0
25
50
75
100
None
Mild
Moderate
High
The most possible

Appendix O – Mastery VAS


0
50
100
Incapable
Somewhat Capable
Completely Capable

Appendix P – BAT Checklist

Participant# _____

Pre-Treatment

DATE:

1 Informed Consent
2 Exclusionary Criteria
3 Demographics Form
4 ADIS-IV
5 Anxiety Battery
6 Phobia Battery
7 Attach Heart Rate Monitor

Pre-BAT

HR 1	Anxiety	Danger	Control	HR 2

BAT-1

A >12 ft	B 12 ft	C 9 ft	D 6 ft	E 3 ft	F 0 ft	Touch Outside	Touch Rim	Touch Inside
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*

Anxiety	Danger	Control	HR	Eyes Water	Close Eyes	Cover Face	Cry	Turn Away	Shake	Hold Self	Arms Out	Move Back	Ask Help	Re-Assure

Appendix Q – Sample Participant Monitoring Form

Task #1 – Standing 12′ Away from Cage (line B)

Pre Task

Efficacy	Anxiety	Danger	Control	HR	Start Time

Trials

	Anxiety	Danger	Control
5 sec			
10 sec			
15 sec			
30 sec			

Post Task

Stop Time	Anxiety	Danger	Control	HR	Efficacy

Eyes Water	Close Eyes	Cover Face	Cry	Turn Away	Shake	Hold Self	Arms Out	Move Back	Ask Help	Re-Assure

Task #2 – Standing 9′ Away from Cage (line C)

Pre Task

Efficacy	Anxiety	Danger	Control	HR	Start Time

Trials

	Anxiety	Danger	Control
5 sec			
10 sec			
15 sec			
30 sec			

Post Task

Stop Time	Anxiety	Danger	Control	HR	Efficacy

Eyes Water	Close Eyes	Cover Face	Cry	Turn Away	Shake	Hold Self	Arms Out	Move Back	Ask Help	Re-Assure