Continuous and Interrupted Exposure Therapy in the Treatment of Public Speaking Anxiety

Stacey A. Waller
Western Michigan University

Follow this and additional works at: https://scholarworks.wmich.edu/dissertations
Part of the Clinical Psychology Commons

Recommended Citation
https://scholarworks.wmich.edu/dissertations/1149

This Dissertation-Open Access is brought to you for free and open access by the Graduate College at ScholarWorks at WMU. It has been accepted for inclusion in Dissertations by an authorized administrator of ScholarWorks at WMU. For more information, please contact maira.bundza@wmich.edu.
CONTINUOUS AND INTERRUPTED EXPOSURE THERAPY
IN THE TREATMENT OF PUBLIC SPEAKING ANXIETY

by

Stacey A. Waller

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: Richard Spates Ph.D.

Western Michigan University
Kalamazoo, Michigan
April 2004
CONTINUOUS AND INTERRUPTED EXPOSURE THERAPY  
IN THE TREATMENT OF PUBLIC SPEAKING ANXIETY

Stacey A. Waller, Ph.D.  
Western Michigan University, 2004

Current research suggests that exposure-based interventions are the treatment of choice for anxiety disorders (Barlow & Wolfe, 1981; Barlow, 1988; 2002; Zinbarg, Barlow, Brown, & Hertz, 1992; Foa, Rothbaum, & Kozak, 1989). While the evidence to date supports the efficacy of these procedures, the precise mechanisms by which they achieve symptom reduction are not yet fully understood. Most theoretical explanations of exposure therapy appeal to the respondent and operant conditioning processes from which the procedure was originally derived. While it is frequently argued that in order to achieve operant and respondent extinction, exposure must be delivered continuously, without interruption (Barlow, 1988; Foa & Kozak, 1986; Groves & Thompson, 1970; Rachman, 1980), the empirical evidence suggests that under the right circumstances interrupted exposure is capable of producing extinction. The present study examined exposure-based therapies for anxiety by isolating the exposure procedure from these complex treatment packages. Two experiments were used. The first experiment tested the hypothesis that in vivo exposure to anxiety-producing stimuli in the absence of other treatment package components leads to a reduction in anxiety symptoms. Three participants with public speaking anxiety were
exposed to a continuous public speaking task in a multiple-baseline across subjects design. The intervention produced reductions in anxiety symptoms in those symptom clusters for which initial reactivity was evident. However, there was much variability both within and across participants with regard to the overall effectiveness of the interventions. On self-report measures administered at pre- and post-treatment, the results were variable across participants.

The second experiment tested the hypothesis that anxiety reduction is achieved when the exposure is delivered in brief doses. Three participants with public speaking anxiety were exposed to a public speaking task in 30-sec. doses in a multiple-baseline across subjects design. The intervention produced reductions in anxiety symptoms across clusters between pre- and post-treatment. Within-session response patterns suggested lower levels of anxiety within the intervention than those evident during the continuous intervention. The results are discussed within the context of the existing exposure therapy literature and current theoretical accounts of exposure therapy.
ACKNOWLEDGMENTS

There are so many people to whom I am thankful who have contributed in so many ways to the completion of this project. I would like to start by thanking Dr. C. Richard Spates for his guidance and encouragement throughout all aspects of the study. I would also like to thank my committee members, Dr. Lisa Baker, Dr. Amy Naugle, and Dr. Lisa Largo-Marsh for their helpful feedback and suggestions.

I am sincerely grateful for the hard work and dedication of my team of research assistants, Megan Bolles, Brenda Bratton, Amanda Harris, Theresa Horn, Andrea Ibershoff, Anna Magner, Nicole Percowycz, Adeya Richmond, Nishani Samaraweera, and Yukiko Washio. Without their willingness to put in long hours, evenings, and weekends, this research would not have been possible. I also want to thank Donna Arreaux for providing invaluable office and organizational support. I also thank the anonymous individuals who volunteered to participate in the study.

On a personal note, I would like to express my appreciation to my family and friends for their support and encouragement throughout this entire process. Their love and prayers gave me the strength to succeed in this endeavor.

Finally, words cannot express my gratitude to Jamie for his unyielding support. His patience, encouragement, and company on the many long trips between West Virginia and Kalamazoo helped me to persevere. Thanks for believing in me.

Stacey A. Waller
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>ii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vii</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Applications of Exposure Therapy</td>
<td>3</td>
</tr>
<tr>
<td>Infra-human Analog Studies</td>
<td>5</td>
</tr>
<tr>
<td>Extinction of Conditioned Avoidance Responses</td>
<td>5</td>
</tr>
<tr>
<td>Extinction of Conditioned Fear</td>
<td>8</td>
</tr>
<tr>
<td>Human Studies</td>
<td>10</td>
</tr>
<tr>
<td>Summary</td>
<td>15</td>
</tr>
<tr>
<td>PROBLEM STATEMENT</td>
<td>16</td>
</tr>
<tr>
<td>EXPERIMENT 1</td>
<td>20</td>
</tr>
<tr>
<td>Method</td>
<td>20</td>
</tr>
<tr>
<td>Setting</td>
<td>20</td>
</tr>
<tr>
<td>Apparatus</td>
<td>20</td>
</tr>
<tr>
<td>Measures</td>
<td>21</td>
</tr>
<tr>
<td>Experimental Design</td>
<td>26</td>
</tr>
<tr>
<td>Procedure</td>
<td>27</td>
</tr>
<tr>
<td>Human Subjects Protection</td>
<td>32</td>
</tr>
<tr>
<td>Results</td>
<td>33</td>
</tr>
<tr>
<td>Participant Characteristics</td>
<td>33</td>
</tr>
</tbody>
</table>
Table of Contents—

Subjective Anxiety ................................................................................................ 35
Heart Rate .............................................................................................................. 37
Avoidance .............................................................................................................. 37
Timed Behavioral Checklist ................................................................................ 40
Pre-post Measures ................................................................................................. 41
Distress Evaluation Scale ..................................................................................... 41

EXPERIMENT II...................................................................................................................... 43
Method .............................................................................................................................. 43
Results ............................................................................................................................... 43
Participant Characteristics ................................................................................... 43
Subjective Anxiety ................................................................................................ 44
Heart Rate .................................................................................................................. 46
Avoidance .................................................................................................................... 48
Timed Behavioral Checklist ................................................................................ 48
Pre-post Measures ................................................................................................. 48
Distress Evaluation Scale ..................................................................................... 52

DISCUSSION........................................................................................................................... 52
Limitations ....................................................................................................................... 58
Future Directions ............................................................................................................ 60

APPENDICES
A. Screening Questionnaire ......................................................................................... 63

iv
Table of Contents—

APPENDICES

B. Informed Consent Document ................................................................. 66
C. Human Subjects Institutional Review Board Approval ....................... 70
D. Raw Score Values for Data Presented in Figures 1 through 8 .......... 74

REFERENCES ................................................................................................. 79
LIST OF TABLES

1. Raw Scores at Pre-treatment, Post-treatment, and Follow-up and Percent
   Change on Self-report Measures for Experiment I ................................................. 42

2. Raw Scores at Pre-treatment, Post-treatment, and Follow-up and Percent
   Change on Self-report Measures for Experiment II ............................................... 51
LIST OF FIGURES

1. Subjective Units of Discomfort (SUD) and Peak SUD Ratings for Experiment I .......................................................... 36
2. Mean and Peak Absolute Heart Rates for Experiment I ......................................................... 38
3. Avoidance Ratings for Experiment I ..................................................................................... 39
4. Timed Behavioral Checklist (TBCL) Scores during the Behavioral Avoidance Tests and Treatment for Experiment I ..................................................... 40
5. Subjective Units of Discomfort (SUD) and Peak SUD for Experiment II ................. 45
6. Mean and Peak Absolute Heart Rates for Experiment II .................................................. 47
7. Avoidance Ratings for Experiment II ................................................................................... 49
8. Timed Behavioral Checklist (TBCL) Scores during the Behavioral Avoidance Tests and Treatment for Experiment II .............................................. 50
INTRODUCTION

It has long been recognized that exposure-based therapies are the treatments of choice for anxiety disorders (e.g., Barlow & Wolfe, 1981; Barlow, 1988; 2002; Zinbarg, Barlow, Brown, & Hertz, 1992; Foa, Rothbaum, & Kozak, 1989). The Task Force on Promotion and Dissemination of Psychological Procedures (Chambless et al., 1998) lists among its well-established treatments exposure therapies for agoraphobia, social phobia, and obsessive-compulsive disorder, along with several other treatment packages for anxiety that contain exposure procedures. In randomized controlled trials, cognitive-behavioral approaches have been shown to produce significant improvement in the majority of subjects diagnosed with panic disorder with agoraphobia (e.g., Barlow et al., 2000), specific phobia (e.g., Öst, Salkovskis, & Hellstrom, 1991), social phobia (e.g., Hope, Heimberg, & Bruch, 1995), posttraumatic stress disorder (e.g., Foa, Rothbaum, Riggs, & Murdoch, 1991), generalized anxiety disorder (e.g., Borkovec, Newman, Pincus, & Lytle, 2001), and obsessive-compulsive disorder (e.g., van Balkon, van Oppen, Vermeulen, Nauta, Vorst, & van Dyck, 1994).

While the effectiveness of exposure-based interventions is widely demonstrated, little attention has been given to uncovering the precise mechanism of action underlying these therapies. As Foa & Kozak (1997) have argued, a gap exists between clinical practice and basic research that has limited behavior therapy’s ability to reach its full potential.
Understanding the mechanism underlying these procedures requires a closer examination of exposure itself. However, to assert that a treatment package operates via exposure is an incomplete analysis of the mechanism. Exposure refers to a process or set of procedures in which the individual makes contact with a particular stimulus (Barlow, 1984). Thus when a procedure is said to operate via exposure, this describes only the process. However, what is not well-understood is the mechanism by which exposure leads to symptom reduction. By better understanding the mechanism by which these procedures operate, ultimately, more effective, efficient interventions can be developed.

In explaining exposure therapy, behavior theory provides several potential candidates working in isolation or in combination. Exposure therapies were originally developed on the basis of the behavioral principles of extinction and habituation. Dollard and Miller (1950) applied Mowrer's (1950) two-factor model to the conceptualization of anxiety. Conceptualized from Mower's (1950) two-factor theory, anxiety is conditioned through respondent conditioning and maintained through operant conditioning. Fear is initially conditioned through respondent conditioning when an aversive stimulus is paired with neutral stimulus. As a consequence, the previously neutral stimulus comes to elicit the fear response. The second component is the conditioning of avoidance responses. Responses that produce termination of the conditioned stimulus are negatively reinforced. Fear and avoidance are maintained because avoidance responses continue to be reinforced by response-contingent termination of the conditioned stimulus. This serves to minimize contact with the conditioned stimulus thereby limiting opportunities for respondent
extinction. Simultaneously, any desired approach responses are automatically punished by the aversive contingencies in place.

While it is often the case that a specific conditioning event is not identifiable, exposure therapies assume that respondent and operant conditioning principles apply. One goal of exposure-based interventions is to act upon the first component to allow respondent extinction of conditioned fear responses. The second goal is to achieve operant extinction of conditioned avoidance responses. A third goal is to achieve successful approach behavior which is accomplished by providing both guidance and reinforcement for such behavior after weakening the automatic punishment contingencies. By understanding the range of conditions under which these processes work, we can better understand the optimal procedures for administering exposure therapy.

Applications of Exposure Therapy

There is wide variation in the administration of exposure therapies. For example, systematic desensitization (Wolpe, 1958) exposes subjects to anxiety producing stimuli while maintaining a state of relaxation. In contrast, flooding (Boudewyns & Shipley, 1983; Stampfl & Levis, 1967; Lyons & Keane, 1989) procedures expose subjects to both anxiety producing stimuli and intense levels of anxiety. Because early evidence suggested that the experience of intense anxiety is not necessary to achieve symptom reduction (Hafner & Marks, 1976), this element is often omitted from contemporary exposure therapies. The term, prolonged exposure, (Foa & Kozak, 1986) is often used to describe therapeutic situations where intense
levels of anxiety are not intentionally elicited. Prolonged exposure does rely on activation of all aspects of the fear structure (i.e., affective, physiological, and behavioral representations), however. It is the intensity level that differs. Regardless of the specific manner in which the exposure is delivered, the core element of these procedures involves the repeated presentation of conditioned stimuli specific to the evocation of targeted anxiety responses.

More recently EMDR (Shapiro, 1989) has been classified within the general category of cognitive-behavioral therapies. Unlike other CBTs, EMDR was not developed from cognitive or behavior theory. Rather, EMDR represents a procedure in search of theory. Like most cognitive-behavioral interventions for PTSD, a core component of EMDR is an exposure procedure. In addition to the other nonessential elements, the treatment package includes contact with anxiety-related visual imagery. Nevertheless, many researchers have argued that appeals to the mechanism(s) underlying exposure therapy (i.e., respondent and operant extinction) are insufficient to account for the effects obtained in EMDR (e.g., Rogers et al., 1999; Lipke, 1997). The exposure procedure used in EMDR is distinct in several respects from the typical mode of delivery in traditional exposure-based interventions. Most notably, exposure is delivered in a series of brief trials followed by instructions to block out the image. This is in contrast to the mode of delivery suggested by most theoretical accounts of exposure therapy, which claim that exposure requires continued, uninterrupted contact with the feared stimulus (e.g., Barlow, 1988; Foa & Kozak, 1986; Groves & Thompson, 1970; Rachman, 1980). However, as Rodriguez and Craske (1993) have illustrated, the empirical evidence does not offer conclusive evidence on this position.
Indeed, extinction procedures tend to be robust against minor procedural variations. Evidence for this will be provided by examining extinction in infrahuman analog research and human phobia research.

Infra-human Analog Studies

Extinction of Conditioned Avoidance Responses

A number of studies have examined variations on the “dosing” (frequency and duration) of exposure to conditioned aversive stimuli using the conditioned avoidance paradigm. This basic design involves an avoidance training phase in which the subject is permitted to engage in an escape response in the presence of the combined conditioned stimulus (CS) and unconditioned stimulus (UCS) until the subject becomes proficient at avoiding the UCS by responding in the presence of the CS alone. The exposure phase involves presentation of the CS in the absence of the UCS until the CS no longer evokes the avoidance response.

Findings have been mixed regarding the optimal dosing of exposure trials. For example, Polin (1959) examined the extinction of conditioned avoidance responses in 30 male rats of the Wistar strain. Subjects were trained to avoid a buzzer-signaled shock in a standard shuttle-box apparatus. Extinction was evaluated under three different conditions. In the control condition, subjects rested in the home cage for four days. In the barrier condition, training sessions were conducted over four days. During each session, the buzzer was presented for 5 seconds at 30-second intervals and responding was prevented by placement of a barrier over the hurdle. Participants
received 100 seconds of exposure to the buzzer during each session. In the flooding condition, training sessions were conducted over four days. During each session, the buzzer was presented continuously for 100 sec. and responding was not prevented.

The results showed more rapid extinction in the flooding condition than in either of the other two conditions. While these results were used to support the hypothesis that continuous exposure is superior to interrupted exposure, the data are confounded by the inclusion of response prevention in the interrupted condition (i.e., 100 seconds of exposure presented in 5-second doses at 30-second intervals) but not the continuous condition (100 seconds of exposure presented continuously). Consequently, the continuous exposure condition simultaneously included both respondent and operant extinction, which may have made the intervention more powerful.

To separate the effects of dosing and response prevention, Shearman (1970) examined extinction of conditioned avoidance in 50 Sprague-Dawley rats. Subjects were avoidance trained using a shock as the UCS and a tone as the CS. Four extinction conditions were examined in which dosing and response prevention were varied. Subjects received either one 100-sec. presentation of the CS or twenty 5-sec. presentations of the CS, and the avoidance response was either prevented or allowed. When tested under free avoidance conditions in which CS termination was response-contingent, all groups demonstrated extinction of the conditioned avoidance response with no significant differences across conditions.

Likewise, Schiff, Smith, and Prochaska (1972) found no differences in rates of extinction across varied presentations, as long as the absolute exposure durations
were equivalent. Their subjects were 120 rats of the Sprague-Dawley strain. Subjects were runway trained to avoid shock signaled by 10 sec. white noise by running to the goal box. Extinction training included 1, 5, or 12 trials of 0-, 5-, 10-, 50-, or 120-sec. presentation of the CS. Avoidance responses were blocked during this phase. During the final phase, the CS was presented without the UCS, and responses were not blocked. This phase terminated when extinction was complete, defined as 3 consecutive trials with latencies of at least 120 sec. to reach the goal box, or when 50 trials had been completed. Neither the duration of blocking trials nor the number of blocking trials presented predicted the number of trials necessary for extinction in the final phase. Rather, total duration was the critical variable, with longer durations predicting more rapid extinctions.

Berman and Katzev (1972) attempted to replicate the methodology of Shearman (1970) while adding an additional control condition. They also deviated from the original methodology by shortening the number of extinction sessions to one and extending the total duration of exposure to 200 sec. per session. In contrast to Shearman's findings, they found significant differences between interrupted and continuous exposure. Despite equivalent exposure durations across conditions, results showed that those conditions in which a series of brief trials was presented resulted in more rapid extinction than those containing a single continuous presentation. This distinction may have arisen due to the overall fewer number of extinction trials in the latter study. Perhaps differences that emerge early in the extinction process disappear when the number of trials is sufficiently extended. Also, Shearman (1970) examined extinction patterns over a period of nine days (20 trials per day), while the present
study included 50 extinction test trials conducted one-minute following training within a single day. Thus, the interval between training and test occasions may have impacted extinction patterns.

In a variation on the conditioned avoidance paradigm, Martasian, Smith, Neill, and Reig (1992) examined massed and distributed extinction training with and without response prevention. After 2 non-signaled escape acquisition trials, subjects were randomly assigned to extinction training conditions. Massed treatment included 1, 2, or 3 sessions of 24, 12, or 8 min., respectively. Distributed treatment included 8, 12, or 24 sessions of 3, 2, or 1 min., respectively. Results revealed no significant differences between massed and distributed exposure at either one- or 30-day post treatment assessment. While the total exposure durations were much shorter in this experiment than those described previously, the fewer number of acquisition trials may have interacted to require fewer extinction trials.

**Extinction of Conditioned Fear**

While the conditioned avoidance paradigm offers a directly observable method for studying extinction of fear behaviors, it does not permit an examination of extinction of the affective components of anxiety. When avoidance behaviors decrease in the presence of the CS after exposure training, it is assumed that the CS no longer elicits fear and is no longer an establishing operation for the avoidance response. However, as Lang (1979) has argued, anxiety comprises three individual response systems (i.e., affective, behavioral, and physiological) that are not always
concordant. It has further been argued that fear in the presence of the CS often persists, despite extinction of avoidance responses (Shipley, 1974).

In order to examine extinction of the affective component of anxiety, the conditioned fear paradigm was developed. In the conditioned fear paradigm, training of the CR is similar to the procedure used in the conditioned avoidance paradigm. The target response in the conditioned fear paradigm, however, is licking behavior in water-deprived subjects. Suppression of licking behavior is an indication of fear. Two studies of continuous and interrupted exposure have yielded conflicting findings. Shipley (1974) examined the extinction of conditioned fear responses in 128 female water-deprived Blue Spruce hooded rats. Fear was conditioned through repeated pairings of a tone and a shock, and was defined as suppression of drinking responses in the presence of the CS. Extinction conditions involved 8, 16, or 32 presentations of the CS for 25 sec. each or 2, 4, or 8 presentations of the CS for 100 sec. each. During suppression testing, the CS was presented for 150 sec. Results showed that longer total exposure durations resulted in more rapid extinction, irrespective of the number of trials or duration of trials.

In a subsequent study using the lick suppression paradigm, Baum, Andrus, & Jacobs (1990) paired presentations of a light stimulus with shock. Extinction training involved one of three conditions presented on even-numbered days: (1) 18 presentations of 10-sec. illumination on a VT-40 sec. schedule; (2) 6 presentations of 30-sec. illumination on a VT-190 sec. schedule; or (3) 1 presentation of 180 sec. On odd-numbered days, all rats were placed in the chamber where licking was retrained, and licking in the presence of illumination was trained. The results showed that
extinction was more rapid in the interrupted conditions than in the continuous condition. Further, the interrupted conditions resulted in less spontaneous recovery than the continuous condition.

Thus in non-humans, the extinction of fear, whether using conditioned fear or conditioned avoidance analog paradigms, is a highly variable process. Evidence is inconsistent as to whether massing or distributing extinction trials produces the most rapid extinction. It appears that a number of procedural variables may interact with dosing to produce differential outcomes. What is clear, however, is that under the right circumstances, exposure trials can be delivered in either a continuous or interrupted manner to achieve extinction.

While these comparative analog studies provide the necessary foundation for understanding basic processes involved in extinction, they are unlikely to adequately capture the mechanisms underlying complex human anxiety disorders. In particular, these models cannot account for the role of verbal behavior and its impact on extinction. Also, the conditioning history is always known in these analog studies, whereas in human anxiety the conditioning history is typically unknown. Therefore, application of these procedures in humans will be examined.

Human Studies

The “dosing” of exposure therapy in the treatment of human anxiety has been examined by a number of investigators. While it is widely held that longer duration exposures are superior to shorter duration exposures (e.g., Rabavilas, Boulougouris, & Stefanis, 1976; Stern & Marks, 1973), such conclusions often vary as a function of
the manner in which “long” and “short” are defined. These studies vary widely in terms of the specific populations under investigation and in terms of the number, duration, and spacing of trials.

One of the earliest comparisons of shorter and longer exposure trials examined differing durations of systematic desensitization sessions (Ramsay, Barends, Breuker, & Kruseman, 1966). These investigators compared 20 minutes of imagery on 4 consecutive days with 40 minutes of imagery on 2 days spaced one week apart. They found that treatment delivered in 4 brief trials was superior to treatment delivered in 2 prolonged trials. However, the duration of exposure is confounded with differences in inter-trial interval (i.e., 1 day versus 1 week). Because during systematic desensitization, a low level of arousal is maintained, new associations between anxiety-evoking stimuli and non-anxious responses are made earlier in the session than in flooding. As a result, the duration of the exposure trial may be less critical than other factors.

During flooding procedures, subjects typically demonstrate a pattern of rapidly increasing anxiety, followed by a gradual return to baseline (Marshall, Gauthier, & Gordon, 1979; Foa & Chambless, 1978). Consequently, interrupting the procedure at different points in time may result in differential learning.

Stern and Marks (1973) evaluated the effects of delivering imaginal and in vivo flooding in several long or short sessions among subjects with agoraphobia. Four full-day treatment sessions were administered at a rate of 2 sessions per week. Each session included both imaginal and in vivo exposure. Long imaginal sessions included 80 minutes of flooding, followed by 40 minutes of neutral imagery. Short sessions
alternated 10 minutes of flooding with 5 minutes neutral imagery for 2 hours. Long \textit{in vivo} flooding included 2 hours of continuous practice; short \textit{in vivo} flooding included 30 minutes practice alternated with 30 minutes rest for 2 hours. Each subject received long exposure for 2 days and short exposure for 2 days in counterbalanced order.

There were no significant differences between long and short imaginal treatments on self-report or observer-rated measures. However, neither condition produced significant reductions in symptoms, leaving open the possibility that effects of type of exposure might have emerged had positive outcomes been attained. There were significant differences with respect to \textit{in vivo} exposure. Long exposures were more effective than short exposures on both observer-rated and self-report measures of fear and avoidance.

Matthews and Shaw (1973) examined extinction patterns among spider-phobic women receiving one session of continuous or interrupted exposure to audio-taped descriptions of spider-relevant scenarios. The scenarios were further divided into high-arousal or low-arousal conditions based upon their content. In the interrupted group, six 8-min. spider-relevant scenarios were alternated with six 4-min. neutral scenarios. In the continuous condition, six neutral scenarios were played in succession, followed by six spider-relevant scenarios. Results showed no significant differences between the continuous or interrupted presentation of the material on self-report measures. On a behavioral avoidance test, subjects in the continuous exposure condition provided low-arousal material exhibited improvement, while none of the other groups improved. The low arousal condition included realistic, safe interaction with the spider, while the high arousal condition included
horrific, unrealistic images. Consequently, the learning that occurred in the high arousal condition included information about the danger of spiders rather than safety.

Chaplin and Levine (1981) examined continuous vs. interrupted flooding in the treatment of public speaking anxiety in 48 college students. Subjects were exposed to audio-taped scenarios for a total duration of 50 minutes per session, with the interrupted group receiving two 25-minute trials separated by a 10-minute break, and the continuous group receiving 50 minutes of uninterrupted exposure. At post-test on behavioral measures, subjects receiving continuous exposure exhibited less anxiety than those receiving interrupted exposure. There were significant, positive correlations between SUDs scores and time during the first 25 minutes. During the second 25 minutes, the correlations were positive for the interrupted group, but negative for the continuous group. Thus, while both groups reported increasing levels of anxiety over the course of the first 25 minutes, the continuous group reported decreasing SUDs over the second 25 minutes and the interrupted group reported increasing SUDs over the second 25 minutes. There were significant decreases in average SUDs ratings during treatment between sessions for both groups, with no differences between groups. Thus these findings were in concordance with Matthews and Shaw (1973) in that continuous exposure resulted in greater improvement on behavioral measures and no differences between conditions on self-report measures. Differences did emerge with respect to the process of symptom change, however.

Grey, Rachman, and Sartory (1981) compared continuous and interrupted exposure in 28 subjects with animal phobias. Subjects received one treatment session in which they were exposed to the phobic stimulus at a distance eliciting maximum
anxiety for 20 minutes. In the massed condition, they were exposed continuously for the entire 20 minutes at distance eliciting a SUDs rating of 100. Subjects in the interrupted condition were exposed during 10 trials of 2 minutes each, separated by a one-minute break. Following the session, subjects were guided through 30 minutes of relaxation exercises. On SUDs ratings, the interrupted group showed slightly more reduction in ratings immediately after treatment and following relaxation and greater return of fear one week following treatment. There were no differences between groups on behavioral avoidance or physiological measures.

Marshall (1985) systematically evaluated the comparative efficacy of brief, standard, and prolonged in vivo exposures in the treatment of specific phobia. Sixty subjects were randomly allocated to one of 2 brief exposure conditions, exposure that terminated when anxiety levels had reduced, one of two conditions where exposure extended beyond the point of anxiety reduction, or no treatment. The brief exposure conditions produced no significant improvement relative to the control group. All three of the longer duration groups showed significant improvement, with the effects being further enhanced on behavioral measures at one-month follow-up for those in the prolonged conditions.

Finally, a series of studies by Öst and colleagues (Öst, Alm, Brandberg, & Breitholtz, 2001; Hellström K., Fellenius, J., & Öst, L.-G.; 1996; Öst, Hellström, & Kåver, 1992; Öst, Brandberg, & Alm, 1997) compared one 3-hour session of continuous in vivo exposure to five one-hour sessions of in vivo exposure in the treatment of a variety of specific phobias. They found no significant differences in treatment outcome between a single session and distributed sessions. However, across
studies, the two groups differed in total duration of exposure. Thus it is unclear what impact massing would have had if the total durations had been equivalent.

In a variation on this methodology, Rowe and Craske (1998) delivered 4 sessions of *in vivo* exposure therapy for spider phobia over the course of a single day (massed) or an entire week with the inter-session interval progressively increasing (expanding distributed). Across behavioral, physiological, and self report measures, the massed condition exhibited significantly better outcomes than the expanding distributed group. However, when generalization was tested with a novel spider, the distributed group showed significantly better outcomes, while the massed group demonstrated return of fear. In a follow-up study using a sample of individuals with public speaking anxiety (Tsao & Craske, 2000), participants were administered 3 seven-minute *in vivo* exposures consecutively in a single session, spaced uniformly (5 days apart), or spaced on an expanding schedule (1, 4, 10 days apart). In contrast to the above findings, there were no differences among groups at posttest. However, the massed group demonstrated greater return of fear at 1-month follow-up.

**Summary**

When exposure is delivered in imagination or via audiotape, there appears to be no difference between continuous and interrupted stimulus presentations on subjective reports of anxiety. When behavioral measures are included, continuous exposure appears to be superior. However, in the existing literature, these procedures are typically not extended until extinction occurs for either group. Thus, the failure to detect a difference in subjective measures may reflect a failure to achieve an
experimental effect rather than a true lack of differences between conditions. Further, it is unclear to what extent behavioral differences would be maintained if the procedures were extended to the point of extinction.

There appear to be differences between continuous and interrupted exposure when it is delivered in vivo. However, the literature is mixed with regard to which procedure is more effective. Stern and Marks (1973) and Marshall (1985) reported that continuous exposure was more effective than interrupted exposure on both self-report and observer-rated measures. In contrast, Gray et al. (1981) reported no significant differences on behavioral or physiological measures, while interrupted exposure resulted in greater reductions in SUDs ratings. There are a number of methodological differences in these studies that may account for the different findings. First, Gray et al. (1981) only exposed subjects for a total of 20 min. in both conditions. Consequently, while there were reductions in fear ratings, the exposures were not of sufficient duration to produce complete extinction. Second, in none of these studies was extinction of the target symptoms a criterion for termination of exposure. When extinction is the termination criterion, as in the case of the Öst series of studies, a single, prolonged session appears to be equivalent to several shorter duration sessions.

PROBLEM STATEMENT

A variety of interventions have been evaluated in the treatment of anxiety disorders in controlled outcome studies. Current research suggests that cognitive-behavioral interventions are the treatment of choice (Barlow & Wolfe, 1981; Barlow,
1988; 2002; Zinbarg, et al., 1992; Foa, et al., 1989). Of these cognitive-behavioral interventions, exposure therapies are the most widely researched and have received the greatest empirical support.

While the evidence to date supports the efficacy of these procedures, the precise mechanisms by which they achieve symptom reduction are not yet fully understood. Exposure therapies represent complex treatment packages with a number of potentially active elements. Most theoretical explanations for the efficacy of exposure therapy appeal to the respondent and operant conditioning processes from which the procedure was originally derived. However, the introduction of the atheoretical procedure, EMDR, has challenged our current understanding of exposure. Indeed, much research attention has focused upon deconstructing the procedure to identify which components of the EMDR package are essential to achieving positive outcomes (e.g., Boudewyns, Stwertka, Hyer, Albrecht, & Sperr, 1993; Cusack & Spates, 1999; Devilly, Spence, & Rapee, 1998; Foley & Spates, 1995; Renfrey & Spates, 1994).

The efficacy of EMDR, despite removal of many salient features (e.g., eye movements, cognitive reprocessing), challenges traditional notions of the mechanism of action underlying exposure therapy (i.e., extinction of respondent and/or operant responses). Like traditional exposure therapies, EMDR includes exposure to anxiety-relevant stimuli. However, the means by which exposure is achieved differs in a number of respects, including the degree to which the therapist vs. the client controls stimulus presentation, the degree to which distracting stimuli are concurrently presented, and the degree to which the exposure is interrupted. These differences are
of sufficient ostensible magnitude so as to call into question whether the same mechanisms are at work across the traditional exposure and EMDR procedures.

While it is frequently argued that in order to be effective, exposure must be delivered continuously, without interruption (Barlow, 1988; Foa & Kozak, 1986; Groves & Thompson, 1970; Rachman, 1980), the empirical evidence suggests that under the right circumstances interrupted exposure produces extinction. An examination of extinction in its most simple form using infrahuman analogs to conditioned fear and avoidance reveals wide variation in the conditions under which optimal extinction may be achieved. As the specific experimental preparation is varied, findings regarding the relative superiority of continuous and interrupted exposure vary. In human studies (primarily targeting phobic anxiety and avoidance) continuous delivery does appear to be superior for in vivo exposure, particularly on behavioral measures. However, there is variation in the relative effectiveness of continuous and interrupted exposure on subjective and self-report measures. While it might be argued that behavioral measures are more objective and therefore more accurate measures, it is possible that behavioral and self-report measures are tapping different constructs. Specifically, behavioral measures tend to target avoidance, while self-report measures tend to target emotional arousal or subjective distress. As the infrahuman literature has demonstrated, these may be independent processes and are subject to differential patterns of extinction.

Further, the results vary as a function of the termination criteria employed. It appears that when extinction is the termination criterion, both prolonged and interrupted trials lead to extinction. Thus the differences may be more evident in
process than in the outcome. Finally, the manners in which continuous and interrupted exposures have been defined vary widely across studies. To date, no study has examined the feasibility of delivering exposure in brief trials with brief inter-trial intervals approximating those used in EMDR therapy.

The proposed investigation is an initial step in this effort. It will more closely examine exposure-based therapies for anxiety by isolating the exposure procedure from these complex treatment packages.

The first question to be addressed by the present study is whether or not in vivo exposure to anxiety-producing stimuli in the absence of other treatment package components produces reductions in anxiety symptoms. The first experiment will examine this question. Exposure will be delivered in a continuous, uninterrupted format. The goal of this experiment is to establish the efficacy of in vivo exposure in achieving symptom reduction and to provide a baseline intervention against which parametric variations may be explored.

Once this question has been addressed, the next question is whether or not an interrupted variation of exposure, delivered in a dosing arrangement similar to EMDR produces symptom reduction. The second experiment will address this question by evaluating an interrupted exposure procedure replicating the dosing of EMDR. During each experiment, the process by which symptom reduction is achieved will be examined by employing both within session and between session analyses comprising cognitive, behavioral, and physiological measures.

These questions will be examined using a sample of participants selected from a population of public-speaking anxious individuals. Public-speaking anxiety was
selected for purposes of the present protocol for a several reasons. First, public speaking anxiety is one form of social phobia, and *in vivo* exposure therapy is well-established as an effective treatment for social phobia (see Feske & Chambless, 1995 for a review). Second, public speaking anxiety is frequently and effectively used as an analog to other anxiety disorders in research examining variations of exposure, including EMDR (e.g., Foley & Spates, 1995; Carrigan & Levis, 1999).

EXPERIMENT I

Method

Setting

All sessions were conducted in small treatment rooms at Western Michigan University. Rooms were furnished with four chairs, a podium, and video equipment. In order to eliminate potential sources of distraction, all other objects and decorations were removed from the room. During behavioral assessments and treatment, participants were positioned on one end of the room behind a podium. Observers were seated directly in front of the participant. A video camera was positioned behind the observers, and directly in the participant’s line of vision. Participants were seated during the interview and while completing questionnaires.

Apparatus

Heart rate was assessed using the Polar Accurex Plus™ heart rate monitor. The monitor is attached to an elastic strap worn around the chest. The device is
equipped with ECG sensors that transmit data to a wristwatch receiver worn by the subject. Data are stored on the wristwatch receiver in 5, 15, or 60 sec. intervals. Originally developed for exercise enthusiasts, these monitors have been adopted by sports medicine researchers for ambulatory heart rate assessment. Accuracy ratings are excellent (0.97–0.99 correlations with ECG measures; see Laukkanen & Virtanen, 1998 for a review).

**Measures**


The Personal Report of Communication Apprehension – 24 (PRCA-24) was used to screen participants for public speaking anxiety and to assess changes in communication anxiety over time. This is a 24-item inventory to which respondents indicate their level of agreement on a 5-point scale with statements about communication experiences. There are four subscales, assessing speaking in groups, speaking in meetings, dyadic communication, and public speaking. A score of 18 or higher on any subscale indicates apprehension regarding that particular category of communication. Adequate reliability has been demonstrated in a number of investigations (Beatty & Andriate, 1985; McCrosky, 1984; McCrosky, Beatty, Kearney, & Plax, 1985), with internal consistency estimates above 0.90. The Public Speaking subscale has an internal consistency coefficient of 0.74 (Beatty, 1987). The scale also demonstrates good content validity (McCroskey, et al., 1985). Predictive and concurrent validity with behavioral and self-report indices of communication
anxiety on speech tasks has been demonstrated (Beatty, 1987; Beatty & Andriate, 1985).

**Screening Questionnaire**

The screening questionnaire (Appendix A), developed for purposes of the present study, includes questions regarding demographic and background characteristics, along with selection criteria not addressed by standardized measures.

**Anxiety Disorders Interview Schedule for DSM-IV (Brown, DiNardo, & Barlow, 1994)**

The Social Phobia section of the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV) was used during screening and at follow-up to assess symptoms of Social Anxiety Disorder specific to public speaking and other social situations. This semi-structured interview is designed to establish diagnoses of anxiety, mood, somatoform, and substance-related disorders. It is based on the DSM-IV (American Psychiatric Association, 1994) diagnostic criteria for these disorders. In addition to diagnosis, the interviewer also assigns a clinical severity rating. Excellent inter-rater reliability for the social phobia diagnosis has been reported (kappa = 0.77; Brown, DiNardo, Lehmann, & Campbell, 2001). Agreement on dimensional severity ratings is excellent, as well (situational fear, r = 0.86; situational avoidance, r = 0.86; clinical severity, r = 0.80).
State-Trait Anxiety Inventory (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983)

State anxiety was measured at pre-test and post-test using the State-Trait Anxiety Inventory State subscale (STAI-State). The instrument has good internal consistency and construct validity (Spielberger & Vagg, 1984). Confirmatory factor analysis supports the two-factor structure of the complete instrument (Bernstein & Eveland, 1982).

Behavioral Avoidance Test

Behavioral, physiological, and subjective manifestations of public speaking anxiety were assessed using a behavioral avoidance test (BAT). The BAT was conducted using the impromptu speech task methodology. The impromptu speech task is commonly used as a behavioral measure of public speaking anxiety and has demonstrated good one week test-retest reliability on measures of heart rate (r = 0.82), duration (r = 0.77), and escape (phi = 0.71; Beidel, Turner, Jacob, & Cooley, 1989). Replicating the methodology of Beidel et al., subjects were given five topics (determined at random). They were instructed that they could use up to three of those topics during a 10-min. speech. Subjects were given 3 min. to prepare their speech. Participants were instructed to speak for at least 3 min., and that it was preferred that they speak for 10 min. Participants were told they could end the speech at anytime after the 3-min. period if they experienced significant distress by holding up an index card on which the word “Stop” was written. Two research assistants served as
audience members, in addition to the therapist. These observers recorded behavioral observations, using a 30-sec. interval recording procedure and a standardized observation schedule, the Timed Behavioral Checklist for Performance Anxiety (TBCL; Paul, 1966). At the end of the speech, the participant was asked to provide his/her maximum and current SUD ratings. The task terminated after 10 min. or when the subject displayed the index card with the word “Stop”.

**Timed Behavioral Checklist (Paul, 1966)**

The Timed Behavioral Checklist (TBCL) was used as a behavioral measure of speech anxiety during the BAT and treatment. The checklist contains 20 items. Observers record the presence or absence of these 20 behaviors during 30-sec. intervals during the first 4 minutes of a speech. The checklist was be modified by increasing or decreasing the number of intervals to accommodate the entire speech. Paul (1966) reported reliability coefficients (alpha) of 0.93 to 0.96 for the total instrument. The TBCL was administered by live observers throughout the BATs and treatment in order to provide data regarding the behavioral termination criterion and to provide consistency in audience behavior across conditions. In order to control for potential observer bias, 30-sec. samples were randomly selected from each third of each 5-min. speech interval during exposure and from the first 3 min. of the BATs. These samples were recorded in random order on video tape and rated by independent observers blind to treatment condition, order, and study hypotheses. Due to the quality of the videotapes, observers were unable to detect four of the target behaviors.
(flushing, perspiring, paling of the face, and trembling of the knees). Consequently, these four behaviors were eliminated from the checklist.

**Subjective Units of Discomfort (Wolpe, 1969)**

The Subjective Units of Discomfort (SUD) scale is a 100-point scale by which respondents rate the level of distress caused by anxiety-producing stimuli. SUD ratings were obtained throughout assessment and treatment at 5-min. intervals, as well as at phase transitions. In addition, subjects were asked to estimate peak SUD levels for each interval of assessment at the end of the 5-min. interval or at the endpoint of the phase prior to phase transitions.

**Distress Evaluation Scale (Devilly & Spence, 1999)**

The DEVS is an 8-item self-report instrument designed to assess the degree of distress and intrusiveness of the treatment procedure utilized. The instrument is designed to be administered upon termination of therapy.

**Participants.** Participants were recruited via postings on campus and announcements in undergraduate psychology and communications classes. Individuals who were 18 years of age or older were eligible to participate. Those volunteers who reported significant anxiety in regard to public speaking as indicated by a score of 18 or higher on the public speaking component of the PRCA-24, ADIS-IV fear and avoidance ratings of 6 or higher in regard to public speaking, and ADIS-IV physical symptom ratings of 4 or higher for at least two symptoms were selected.
Exclusion criteria included migraine headaches, heart disease, asthma, seizures, ulcers, un-cued panic attacks, delusions, hallucinations, paranoia, and current medications for anxiety or depression. Participants were offered extra credit points in their psychology classes as compensation for their participation. However, only one participant was enrolled in a class in which extra credit points were offered for research participation. The remaining participants received no compensation.

**Experimental Design**

A non-concurrent multiple-baseline across subjects design (Kazdin, 1982) was used to evaluate the efficacy of each of the two treatment variations. The design consisted of three phases: baseline, treatment, and post treatment. For increased precision in analysis, the treatment phase was subdivided into three separate components - education and instruction, speech preparation, and exposure. Two individual multiple baseline experiments were conducted using a systematic replication methodology (Hernsen & Barlow, 1976). The single-case methodology is recognized as an efficient means of isolating the mechanism of action of an established treatment package, and is recommended as a means of evaluating the efficacy of individual treatment components and the conditions under which they are effective prior to evaluating the complete treatment package in a between groups arrangement (Hernsen & Barlow, 1976). While a number of treatment packages including exposure have been evaluated in group comparisons, individual mechanisms have not been isolated and systematically evaluated. This design permitted the exploration of a potential mechanism for symptom reduction, potential
variations in its mode of delivery, and established a base intervention for future
treatment package construction.

Procedure

The experiment included three sessions, spaced one week apart. These
included screening, treatment, and follow-up. The treatment session was further
divided into three phases: pre-treatment assessment, baseline, intervention, and post-
treatment assessment.

Screening

A trained graduate or undergraduate research assistant administered the
informed consent procedure (see Appendix B for Informed Consent document). Once
consent was obtained, participants were asked to respond to the PRCA-24 and the
Screening Questionnaire. The research assistant administered the ADIS-IV, Social
Phobia Section. Participants meeting the following criteria were invited to participate
in the remainder of the study: (a) a score of 18 or higher on the public speaking scale
of the PRCA-24; (b) fear and avoidance scores of 6 or higher for at least one social
anxiety situation (ADIS-IV, items 2a – 2m); (c) at least two physical symptom scores
of 4 or higher (ADIS-IV, items 5a – 5n); (d) interest in obtaining treatment for public
speaking anxiety and availability for sessions; and (e) absence of migraine headaches,
heart disease, asthma, seizures, ulcers, un-cued panic attacks, delusions,
hallucinations, paranoia, or medications for anxiety or depression.
A total of 16 volunteers were screened for the study. Of these, seven met selection criteria and returned for the second session. Three were excluded due to asthma, one reported heart disease, and one reported a history of seizures. Four subjects reported that they were unavailable for additional sessions or failed to show for their treatment session. One additional subject was excluded during treatment due to equipment failure. A total of six participants completed the experimental protocol through post-test. The first three qualifying participants were Experiment I. The final three qualifying participants were assigned to Experiment II.

Pre-test Assessment

After brief interaction to establish rapport, the research assistant recorded the time of the most recent caffeine, substance, and medication use. Participants then completed the PRCA-24 and STAI-State.

The research assistant demonstrated how to apply the heart rate monitor, by modeling its application over his/her clothing. The subject then applied the chest strap under his/her clothing in privacy. Once the monitor was determined to be properly functioning, the participant remained standing for a 3-min. acclimation period. At the end of the acclimation period, the initial baseline heart rate was recorded and the participant provided an initial SUD rating. The research assistant then administered the BAT. Heart rate was continuously monitored during the BAT, and participants provided SUD and avoidance ratings at the conclusion of the BAT.
Baseline

Immediately following the BAT, participants began the baseline assessment phase. In order to establish a baseline against which the efficacy of the treatment in eliciting anxiety can be evaluated (a pre-requisite for evaluating extinction), participants were instructed to remain at the podium while resting. A selection of magazines was provided for the participant to read during this period of rest. Heart rate was continuously monitored throughout the baseline phase in 15-sec. intervals. Heart rate was averaged over each 5 minute interval, and peak heart rate for each 5-min. interval was recorded. Participants provided a SUD and peak SUD rating, as well as a rating of the degree to which they felt a desire to avoid the upcoming speech task on a 0 – 8 scale. The first participant in each experiment entered the treatment phase after 15 minutes of baseline measurement. The other participants remained in the baseline phase for 15 and 30 additional minutes, respectively. Fifteen minutes was chosen because this is the duration of the educational component. Consequently, Participant 2 entered the education phase as Participant 1 began exposure.

Intervention

Treatment began with 15 minutes of education and description of the treatment rationale. Education consisted of instruction on the nature of anxiety (anxiety is a learned behavior that affects 3 response systems: physiological, cognitive, behavioral), the negative reinforcement cycle (anxiety is maintained by escape and avoidance behaviors), and the rationale for exposure therapy (by
confronting the feared situation without escaping or avoiding it, the participant will learn that anxiety will diminish and that the feared consequences do not occur). In order to assure consistency in this component across participants, this component was administered via video tape. Heart rate, SUD, and avoidance ratings were collected throughout this phase.

Following the didactic component, participants were asked to spend 5 min. preparing a speech on 3–5 different topics. Topics were selected from among five options chosen at random. Following this preparation period, the audience was brought into the room, and the participant was instructed to begin speaking.

The intervention administered during the treatment phase was continuous exposure. Participants were asked to speak continuously throughout the treatment phase, cycling through the randomly selected topics repeatedly. Participants were instructed to repeat their speeches as many times as necessary until termination criteria (see below) were reached. Any time the participant stopped speaking for >10 sec., the research assistant prompted, “Please continue speaking.” If the participant indicated that he/she was unable to continue, the research assistant prompted, “You may request a break by saying, ‘Pause’.” Timing of the interval resumed when the participant began speaking. If a participant in this condition requested two pauses in two or more consecutive 5-min. speeches, his/her data were dropped from the analysis. No participant met this criterion, and no data were dropped.

Heart rate, SUD, and fear and avoidance ratings were collected at 5-min. intervals. In addition, an audience member coded performance using the TBCL. Treatment terminated when one of the following criteria were met:
1. SUD levels reached 0 or were 20 or lower for two consecutive intervals, and TBCL ratings reached 0 or were stable for two consecutive speeches.

2. The participant exhibited excessive anxiety or refusal to complete the task.

3. The 3-hour time limit was reached.

Post-treatment Assessment

Immediately following treatment, participants completed the PRCA-24, STAI-State, and BAT.

Follow-up Assessment

Follow-up was scheduled one week following treatment. The research assistant administered the ADIS-IV, Social Phobia section. The participant completed the PRCA-24, STAI-State, DEVS, and a final BAT.

Treatment Integrity

In order to ensure that the treatments were properly administered, protocol outlines were supplied to each therapist after initial training. These outlines described the essential steps in each procedure. All sessions were viewed live or via videotape to determine whether or not each of the essential elements was included as outlined by the protocol. Feedback was provided to the therapists and additional training and calibration was conducted, as needed.
Behavioral Observers

Behavioral observations were completed by trained undergraduate and graduate students. Observers received intensive training in the specific items contained within the TBCL. They were asked to rate videotapes of confederates engaged in public speaking tasks. Observers were trained to at least 90% agreement for these speech samples. During the experiments, all speech samples were scored independently by two observers. Inter-observer agreement was calculated by dividing the number of agreements by the sum of agreements and disagreements for each pair of observers. The average inter-observer agreement was 0.87 (kappa = 0.73).

Human Subjects Protection

This protocol was approved by the Human Subjects Institutional Review Board at Western Michigan University (see Appendix C for approval documentation). All possible measures were taken to protect the welfare of participants against preventable risks. Prior to participation, all potential subjects were asked to read an informed consent document. Their understanding of the document was assessed and necessary clarification was made prior to obtaining consent. Participants were instructed in the consent document, as well as in recruitment materials, that their participation was strictly voluntary and confidential. Participants were free to withdraw from the study at any time without penalty or prejudice. Trained research assistants were available to provide crisis counseling and provided a referral list in the event of significant emotional upset. In addition, participants were debriefed at
the end of their participation. Referrals were provided for any participant who did not experience satisfactory extinction of his/her anxiety responses or who requested additional treatment. No significant adverse reactions were observed or reported.

Participation in this project was confidential. All participants were assigned a unique identifier upon entry in the study. All written information pertaining to participants, including all questionnaires (both those completed and those not completed), data, and videotapes contained only the code number. These data will be kept in a locked file cabinet in room 2523 in Wood Hall for at least five years. The raw data will then be destroyed, although computerized data will be maintained in the Psychology Department indefinitely. Video recordings were destroyed once they were coded. A master list of participant names, phone numbers, and corresponding code numbers was kept in a separate locked cabinet in Wood Hall throughout the duration of the study. This list was destroyed immediately upon the conclusion of the study.

Results

Participant Characteristics

Three individuals participated in Experiment I. All met DSM-IV criteria for Social Anxiety Disorder at the time of enrollment. None were receiving treatment for public speaking anxiety, and none were taking anti-anxiety or anti-depressant medications.
Participant 1 was a 24-year-old Caucasian female. She was enrolled as a senior Psychology major and reported that she was avoiding job interviews due to public speaking anxiety. She reported consumption of a 20-oz. caffeinated soft drink 12½ hours prior to the treatment session and a chocolate candy bar 5½ hours prior to the treatment session. She reported no other substance use. This participant completed treatment and post-test but was lost to follow-up.

Participant 2 was a 24-year-old Caucasian male. He was enrolled as a senior Psychology major and reported that public speaking anxiety had recently caused him to avoid giving a presentation in class. He reported consumption of two alcoholic drinks 1½ weeks prior to the treatment session. He reported no other substance use. This participant terminated treatment early, reporting that he did not realize the treatment would last as long as it did and that he needed to be somewhere else. This participant was lost to follow-up.

Participant 3 was a 41-year-old Caucasian female. She was enrolled in classes part-time and worked full-time. She reported that public speaking anxiety had caused her to delay taking a communications class, which she planned to take the following term. She reported consumption of one 12-oz. soft drink per day during the week preceding treatment. She reported no other substance use. This subject completed all aspects of the protocol.
Subjective Anxiety

Participants rated their current level of anxiety and peak level of anxiety using the Subjective Units of Distress Scale (SUD) at 5-minute intervals throughout all phases of the experiment. Figure 1 displays SUD ratings provided during the 3-minute initial baseline acclimation phase (Baseline 1), the Behavioral Avoidance Test preparation and speech (BAT 1), pre-treatment education and instructions (Instruction), Speech preparation (P), in vivo exposure (Exposure), post-treatment BAT (BAT 2), and follow-up BAT (BAT 3).

As depicted in Figure 1, all participants showed an increase in SUD ratings during the first behavioral avoidance test (BAT 1) relative to initial baseline. Following BAT 1, Participant 1 displayed a return to baseline, while Participants 2 and 3 showed a reduction in SUD below initial baseline responding. All participants showed an increase in SUD ratings during the exposure portion of the intervention relative to Baseline 2. Participants 1 and 2 showed patterns of declining SUD ratings over the course of the exposure session, while Participant 3 showed initial SUD levels below the cutoff for treatment termination and consequently did not show a pattern of diminishing scores. Individual differences were noted in terms of participants' responses during the pre-exposure instruction and speech preparation phases. All participants showed decreases in SUD ratings during BAT 2 relative to BAT 1.

Follow-up data were available for Participant 3. SUD levels increased over BAT 2 levels. However, SUD ratings remained below those observed during BAT 1.
Figure 1. Subjective Units of Discomfort (SUD) and Peak SUD Ratings for Experiment I.
BL = Baseline; BAT = Behavioral Avoidance Test; Instruct = Instruction and Education; P = Preparation of Speech.
Heart Rate

Figure 2 displays participants’ average heart rate and peak heart rate in beats per minute across all phases of the experiment. Participants 1 and 3 showed minimal reactivity during BAT 1 and the exposure intervention relative to baseline. In contrast, a deceleration in heart rate was noted during the speech preparation phase of BAT 1 and treatment, as well as during the treatment instruction phase. These participants evidenced no change in heart rate over the course of the exposure intervention. Participant 1 showed no change in heart rate across the two BATs. Participant 3 showed an increase during preparation for BAT 2 relative to BAT 1 and no change during the exposure phase across the two BATs. At follow-up, Participant 3 had heart rate readings consistent with those observed during BAT 1.

In contrast, Participant 2 showed strong reactivity during BAT 1 and exposure, with a decreasing trend over the course of exposure. There was a decrease in heart rate during the active exposure phase of BAT 2 relative to BAT 1.

Avoidance

Figure 3 displays participants’ ratings of their desire to avoid the speech task across all phases of the experiment. These ratings were provided on a 0–8 scale, with higher scores indicating stronger desire to avoid. All participants initially reported strong feelings of avoidance during BAT 1. However, their avoidance ratings declined upon the return to the baseline condition. Individual differences are apparent in ratings across the three participants during the remaining phases of the experiment.
Figure 2. Mean and Peak Absolute Heart Rates for Experiment I.
BL = Baseline; BAT = Behavioral Avoidance Test; Instruct = Instruction and Education; P = Preparation of Speech; HR = Heart Rate.
Comparisons of the two BATs reveal declines in the preparation phase of BAT 2 relative to BAT 1. Participants 2 and 3 also showed declines during the speech.
phase of BAT 2 relative to BAT 1, while Subject 1 showed no change. Subject 3 showed further declines between BAT 2 and BAT 3.

Timed Behavioral Checklist

Figure 4 displays mean scores on the TBCL for the first 3 minutes of each BAT and each 5-minute interval of exposure. Participants showed little or no variation across BAT 1 and BAT 2. Participants 1 and 3 showed little variation across the treatment, while Participant 2 showed an initial decrease in anxious responding during the first two intervals of exposure, followed by a return to BAT 1 levels in the third interval. Participant 3 showed a 1.7 point decrease in average TBLC scores from post-treatment to follow-up.

Figure 4. Timed Behavioral Checklist (TBCL) Scores during the Behavioral Avoidance Tests and Treatment for Experiment I. BAT = Behavioral Avoidance Test.
Pre-post Measures

In addition to the variables described above, several additional measures were collected at pre-treatment, post-treatment, and follow-up. Table 1 presents data for the PRCA-24, STAI-State, and duration measures for the BAT. Participant 1 showed an overall increase on PRCA-24, reflecting increases on the meeting and dyadic subscales and decreases on the group and public subscales. State anxiety also increased. The duration of BAT 2 was longer than BAT 1. Participant 2 also showed an increase on the PRCA-24, reflecting increases on the group and meeting subscales and no change on the dyadic and public subscales. State anxiety decreased, and BAT duration increased. Participant 3 showed decreases across all questionnaire measures from pre- to post-treatment and pre-treatment to follow-up. BAT durations decreased from BAT 1 to BAT 2, and increased between BAT 2 and BAT 3 remaining below BAT 1 levels. Participant 3 continued to meet DSM-IV criteria for Social Anxiety Disorder at follow-up.

Distress Evaluation Scale

Only participant 3 completed the DEVS. This participant’s total score was 19. This participant’s rating on the individual item addressing overall distress during the treatment session was 8 out of 9, which corresponded to the verbal descriptor, “very distressed.”
Table 1
Raw Scores at Pre-treatment, Post-treatment, and Follow-up and Percent Change on Self-report Measures for Experiment I

<table>
<thead>
<tr>
<th></th>
<th>Participant 1</th>
<th></th>
<th></th>
<th></th>
<th>Participant 2</th>
<th></th>
<th></th>
<th></th>
<th>Participant 3</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Percent</td>
<td>Pre</td>
<td>Post</td>
<td>Percent</td>
<td>Pre</td>
<td>Post</td>
<td>Percent</td>
<td>Follow-up</td>
<td>Percent</td>
<td>Follow-up</td>
</tr>
<tr>
<td>PRCA-24</td>
<td></td>
<td></td>
<td>Change</td>
<td>Pre</td>
<td>Post</td>
<td>Change</td>
<td>Pre</td>
<td>Post</td>
<td>Change</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>17</td>
<td>15</td>
<td>-12%</td>
<td>20</td>
<td>21</td>
<td>+5%</td>
<td>25</td>
<td>21</td>
<td>-16%</td>
<td>21</td>
<td>-16%</td>
<td></td>
</tr>
<tr>
<td>Meeting</td>
<td>19</td>
<td>21</td>
<td>+11%</td>
<td>21</td>
<td>25</td>
<td>+19%</td>
<td>22</td>
<td>20</td>
<td>-9%</td>
<td>21</td>
<td>-5%</td>
<td></td>
</tr>
<tr>
<td>Dyad</td>
<td>15</td>
<td>17</td>
<td>+13%</td>
<td>20</td>
<td>20</td>
<td>0%</td>
<td>24</td>
<td>20</td>
<td>-17%</td>
<td>22</td>
<td>-8%</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>20</td>
<td>19</td>
<td>-5%</td>
<td>30</td>
<td>30</td>
<td>0%</td>
<td>21</td>
<td>19</td>
<td>-10%</td>
<td>21</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>71</td>
<td>72</td>
<td>+1%</td>
<td>91</td>
<td>96</td>
<td>+5%</td>
<td>92</td>
<td>80</td>
<td>-12%</td>
<td>85</td>
<td>-8%</td>
<td></td>
</tr>
<tr>
<td>STAI - State</td>
<td>44</td>
<td>45</td>
<td>+2%</td>
<td>45</td>
<td>34</td>
<td>-24%</td>
<td>54</td>
<td>37</td>
<td>-31%</td>
<td>50</td>
<td>-7%</td>
<td></td>
</tr>
<tr>
<td>BAT Duration (sec.)</td>
<td>283</td>
<td>600</td>
<td>+112%</td>
<td>215</td>
<td>238</td>
<td>+11%</td>
<td>439</td>
<td>277</td>
<td>-37%</td>
<td>330</td>
<td>-25%</td>
<td></td>
</tr>
</tbody>
</table>
EXPERIMENT II

Method

Experiment II was a systematic replication of Experiment I. All aspects of the protocol were identical to Experiment I, with the exception of the intervention delivered during the treatment phase. The intervention in this experiment was interrupted exposure. The treatment phase of the protocol consisted of interrupted exposure. Participants were instructed to speak for 30 seconds at a time, alternating with 30 second breaks, cycling through the randomly selected topics repeatedly. Participants were instructed to repeat their speeches as many times as necessary until termination criteria were reached. If the participant stopped speaking for >10 sec. at anytime, the research assistant prompted, “Please continue speaking.” If the participant indicated that he/she was unable to continue, the research assistant prompted, “You may request a break by saying, ‘Pause’.” Timing of the next 30-sec. interval resumed when the participant began speaking.

Results

Participant Characteristics

Three individuals participated in Experiment II. All met DSM-IV criteria for Social Anxiety Disorder at the time of enrollment. None were receiving treatment for public speaking anxiety, and none were taking anti-anxiety or anti-depressant medications.
Participant 4 was a 25-year-old Caucasian female. She was a junior majoring in Psychology and Women’s Studies. She reported that public speaking anxiety was causing her to avoid taking a speech class and causing excessive anxiety during staff meetings. She reported consumption of two 12-oz. caffeinated soft drinks per day during the week prior to treatment. She reported no other substance use. This participant was lost to follow-up.

Participant 5 was a 34-year-old Caucasian female. She was a senior Professional Studies major who reported a history of avoiding speech classes and taking a failing grade in a class that required a speech. She reported consumption of two cups of coffee during the week prior to the treatment session. She reported no other substance use. This participant was lost to follow-up.

Participant 6 was a 23-year-old Hispanic male. He was a senior Psychology major who reported avoidance of a desired part-time job due to a public speaking requirement. He reported consumption of one cup of coffee 21 hours prior to the treatment session. He reported no other substance use. This participant completed all aspects of the intervention.

Subjective Anxiety

Participants rated their current level of anxiety and peak level of anxiety using the Subjective Units of Distress Scale (SUD) at 5-minute intervals throughout all phases of the experiment. Figure 5 displays SUD ratings provided across conditions.
All participants showed an increase in SUD ratings during the first behavioral avoidance test (BAT 1) relative to initial baseline, with Participant 5 showing very minimal increase. Participants 4 and 5 showed an immediate return to baseline, while
Participant 6 showed a declining trend across the baseline period. Participant 4 showed a slight decrease below initial baseline midway through Baseline 2, while Participant 5 showed a slight increase. Participants 4 and 6 exhibited an attenuated increase in SUD ratings during the active exposure phase, followed by a gradual decline, while Participant 5 showed no change in SUD ratings relative to the end of Baseline 2. This participant showed no change across treatment. Individual differences were observed during the intervals immediately preceding exposure (i.e., during the instruction and education component and during speech preparation).

Participants 4 and 6 exhibited a decline in SUD ratings during BAT 2 relative to BAT 1. Participant 6 showed continued decline between BAT 2 and BAT 3. In contrast, Participant 5 showed minimal reactivity in SUD ratings across conditions and a slight increase in SUD ratings during the BAT 2 relative to BAT 1. All of Participant 5's SUD ratings remained within the range specified a priori for treatment termination.

Heart Rate

Figure 6 shows the mean and peak heart rates for each participant across conditions. Participants 4 and 6 showed increases in heart rate relative to baseline during BAT 1, while neither showed reactivity during the exposure component of treatment. Participant 5 showed minimal initial reactivity to BAT 1, and heart rate during exposure was below baseline. All participants showed lower heart rates during the instructional and preparation phases of treatment relative to initial baseline. All

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
participants showed declines in heart rate during BAT 2 relative to BAT 1, and Participant 6 showed continued decline at follow-up.

Figure 6. Mean and Peak Absolute Heart Rates for Experiment II. 
BL = Baseline; BAT = Behavioral Avoidance Test; Instruct = Instruction and Education; P = Preparation of Speech.
Avoidance

Figure 7 displays avoidance ratings across all phases of the experiment. Each participant displayed a unique response pattern. The most similarity was observed in Participants 4 and 6, both of whom showed declining trends across phases, they differed, however, in that Participant 6 showed a pattern of decline across Baseline 2, and sharp increase, brief plateau and sharp decrease during exposure. Participant 6 showed further decline at follow-up. Meanwhile, Participant 4 showed a more consistent pattern of gradual decline across phases, with the exception of a brief rise during the preparation phase prior to exposure.

Timed Behavioral Checklist

Figure 8 displays mean scores on the TBCL for the first three minutes of each BAT and each 5-minute interval of exposure. Participants showed little or no variation across BAT 1 and BAT 2. Participant 4 showed a slight increasing trend across the treatment, while Participants 5 and 6 showed slight decreasing trends. Participant 6 showed 0.97 point decrease from post-treatment to follow-up.

Pre-post Measures

In addition to the variables described above, several additional measures were collected at pre-treatment, post-treatment, and follow-up. Table 2 presents data for The PRCA-24, STAI-State, and duration measures for the BAT. All participants showed decreases in scores across all scales of
Figure 7. Avoidance Ratings for Experiment II.
BL = Baseline; BAT = Behavioral Avoidance Test; Instruct = Instruction and Education; P = Preparation of Speech.
the questionnaire measures, with the exception of an increase on the meeting subscale of the PRCA-24 by Participant 5. All participants showed longer durations on the post-treatment BAT than the pre-treatment BAT. Participant 6 showed maintenance or further declines on the questionnaires at follow-up and continued increases on BAT duration at follow-up. Participant 6 no longer met DSM-IV criteria for Social Anxiety Disorder at follow-up.
Table 2
Raw Scores at Pre-treatment, Post-treatment, and Follow-up and Percent Change on Self-report Measures for Experiment II

<table>
<thead>
<tr>
<th></th>
<th>Participant 4</th>
<th></th>
<th>Participant 5</th>
<th></th>
<th>Participant 6</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Percent</td>
<td>Pre</td>
<td>Post</td>
<td>Percent</td>
</tr>
<tr>
<td>PRCA-24</td>
<td></td>
<td></td>
<td>Change</td>
<td></td>
<td></td>
<td>Change</td>
</tr>
<tr>
<td>Group</td>
<td>22</td>
<td>17</td>
<td>-23%</td>
<td>22</td>
<td>18</td>
<td>-18%</td>
</tr>
<tr>
<td>Meeting</td>
<td>22</td>
<td>20</td>
<td>-9%</td>
<td>25</td>
<td>27</td>
<td>+8%</td>
</tr>
<tr>
<td>Dyad</td>
<td>20</td>
<td>17</td>
<td>-15%</td>
<td>21</td>
<td>18</td>
<td>-14%</td>
</tr>
<tr>
<td>Public</td>
<td>27</td>
<td>17</td>
<td>-37%</td>
<td>30</td>
<td>22</td>
<td>-27%</td>
</tr>
<tr>
<td>Total</td>
<td>91</td>
<td>71</td>
<td>-22%</td>
<td>98</td>
<td>85</td>
<td>-13%</td>
</tr>
<tr>
<td>STAI - State</td>
<td>39</td>
<td>29</td>
<td>-26%</td>
<td>43</td>
<td>37</td>
<td>-14%</td>
</tr>
<tr>
<td>BAT Duration (sec.)</td>
<td>194</td>
<td>325</td>
<td>+68%</td>
<td>475</td>
<td>600</td>
<td>+26%</td>
</tr>
</tbody>
</table>
Distress Evaluation Scale

Participant 6 completed the DEVS at follow-up. This participant’s total score on the DEVS was 19. This participant rated his distress during the treatment session as 8 out of 9, corresponding to the verbal descriptor, "very distressed."

DISCUSSION

Previous research has shown *in vivo* exposure to be effective in treating a range of anxiety disorders and anxiety-related problems. However, the range of conditions and presentation formats under which exposure may be effectively administered is not well understood. The present study examined two variations of exposure therapy in the treatment of public speaking anxiety.

Experiment I examined whether or not *in vivo* exposure to anxiety-producing stimuli in the absence of other treatment package components, such as relaxation training and cognitive restructuring, leads to a reduction in anxiety symptoms. The results demonstrated that this preparation produced reductions in subjective ratings of anxiety. However, when looking at the full range of anxiety symptoms, the results are variable. One possible explanation for these disparate findings is that treatment termination was contingent only on a reduction in SUD ratings and stable behavioral ratings. Because extinction is not always uniform across response domains (e.g., Rachman, 1978), it is possible that the non-targeted domains would have extinguished at a different rate than SUD ratings. Indeed, Ning and Liddell (1991) demonstrated that concordance across domains increases over the course of the
intervention. Had the exposure duration in the present study been prolonged beyond this criterion or had termination of the intervention been made contingent on reduced scores on other outcome measures, extinction may have occurred on these other variables, as well. However, this is a hypothesis that requires further empirical evaluation.

Experiment II examined whether or not an interrupted variation of exposure, delivered in a dosing arrangement similar to EMDR leads to symptom reduction. The results demonstrated that this preparation did, in fact lead to reductions in anxiety across subjective and physiological measures. Behaviorally, a reduction in escape responses was evident in longer BAT durations at post-test. In contrast, observer ratings of anxiety-related behaviors did not change over the course of the intervention. Overall, this experiment supported the hypothesis that exposure can be effectively administered via a series of brief, interrupted trials.

The question regarding between-session effects of the two exposure preparations was not adequately addressed by the present study. Specifically, attrition was high following the treatment session. Four out of six participants failed to return for follow-up. Consequently, patterns of between-session responding could not be assessed.

In comparing the two studies, several findings are of note. First, the interrupted exposure procedure tended to produce the most consistent anxiety reduction across participants and response domains. Participants showed reductions in anxiety on subjective, physiological, questionnaire, and BAT duration measures. In
contrast, the continuous exposure intervention produced variable patterns of responses both within and across subjects.

This finding is in direct contrast to existing evidence suggesting that continuous in vivo exposure is superior to interrupted exposure (e.g., Stern & Marks, 1973; Marshall, 1985). However, it is consistent with other investigations that have documented that interrupted exposure can be effective under certain arrangements (Gray et al., 1981). Despite these mixed findings, the evidence has overwhelmingly supported the effectiveness of standard exposure protocols (typically, continuous exposure) in treating social anxiety (e.g., Feske & Chambless, 1995). The failure of experiment 1 to demonstrate a strong treatment effect is in direct contrast to this well-established finding.

When examining existing treatment protocols for public speaking anxiety, the typical in vivo protocol requires very brief exposure sessions (e.g., Eckman & Shean, 1997; Tsao & Craske, 2000). Exposure is generally not extended to the point of extinction within a single session. Practical considerations most likely account for this. Specifically, extended periods of speaking require participants to generate material about which to speak. Thus, a participant’s ability to engage in an extended speaking task will ultimately be determined by factors such as the amount of preparation time, knowledge of the topic, and fatigue. The exposure process is more active than in the case of treating specific phobias where participants are not responsible for generating the stimuli to which they are exposed.

The current study sought to overcome this difficulty by asking participants to prepare a 5-minute speech that they were instructed to repeat as many times as
necessary. Unexpectedly, participants universally showed difficulty in following this instruction. All participants continued to generate new material or changed topics when they ran out of new material. When prompted to start at the beginning, many were observed to exhibit signs of frustration or to overtly express their refusal to repeat themselves. One participant apologized to the audience for “boring” them the few times he did repeat one of his speeches.

These findings suggest that the application of continuous exposure to public speaking anxiety is not feasible as is currently practiced with specific phobias. The positive findings for interrupted exposure suggest that modifications to the standard exposure procedure will not necessarily require that participants speak continuously. Rather, participants may benefit from brief exposures with short breaks to prepare new material. This is an important area for follow-up investigation.

Another factor that may account for the differences across experiments is escape behavior. While in both experiments, the same contingencies were in place for escape behaviors (e.g., not speaking for 10 seconds or longer, engaging the therapist in discussion), only participants in the continuous exposure intervention actually made contact with these contingencies. Participants in the interrupted condition were less likely to engage in escape behaviors, and therefore, there was no opportunity for these responses to be inadvertently reinforced.

While verbally-mediated contingencies were established prior to the onset of the exposure session, from a practical perspective, participants could not be prevented from engaging in escape behaviors. The researcher could only redirect the participant after the participant stopped speaking. As a result, each episode of escape responding
was briefly reinforced. While not all stimuli were withdrawn contingent upon an escape response (i.e., the participant remained behind the podium in front of an audience), those stimuli generated by the participant's engagement in the speaking task automatically discontinued once the participant stopped speaking.

Contemporary theories of fear reduction suggest that escape during exposure is detrimental to extinction of the fear response (Fo& Kozak, 1986). Mowrer's (1950) two-factor theory of fear reduction further suggests that escape and avoidance maintain fear responses. Empirically, these findings are consistent with Shearman's (1970) findings, which demonstrated that while there were no differences between a series of brief exposures versus a prolonged exposure, when CS termination was contingent on responding, extinction did not occur. Thus, termination of the CS within the control of the experimenter had no detrimental impact on extinction, while termination within control of the subject was detrimental. This may explain why the interrupted exposure intervention produced reductions in anxious responding even though participants experienced termination of the target stimuli multiple times prior to anxiety reduction. It should be noted that at least one investigation did not find programmed escape to affect extinction (de Silva & Rachman, 1984), while others have found less evidence for extinction within the context of programmed escape (Marshall, 1985).

The findings also speak to the importance of identifying appropriate target stimuli for exposure. Participants displayed differential patterns of reactivity across outcome measures. Indeed initial reactivity demonstrated during the first BAT appeared to be critical in terms of determining whether or not extinction would be
evident within that particular domain. Extinction was only evident within those domains in which initial reactivity occurred. The finding that participants exhibited differential patterns of reactivity is consistent with previous research demonstrating that responding across domains within social phobics tends to be incongruent (Hoffman et al., 1995). It has been further argued that activation of the entire fear structure is essential for complete treatment (Foa & Kozak, 1986). Empirical work has demonstrated that those individuals who display the highest levels of anxiety on various indices seem to benefit most from exposure-based interventions (Foa, Riggs, Massie, & Yarczower, 1995 and Marshall, 1988). Thus, pre-treatment probing of target stimuli to identify those stimuli that elicit anxious responding across all response systems should enhance the overall effectiveness of exposure interventions.

In examining the process of change, participants in the interrupted condition tended to experience lower levels of anxiety during treatment relative to their initial BAT than participants in the continuous condition. Of particular note was the finding that participants' absolute heart rates tended to be lower during the interrupted exposure intervention than during initial baseline. Despite the relatively lower levels of arousal, participants experienced reductions in symptoms at post-test. This finding is important because it suggests that contrary to current theory (Foa and Kozak, 1986), activation of all aspects of the fear structure is not a necessary component of successful fear reduction. However, it may be important that the relevant stimuli be present. In other words, the stimuli must be able to elicit anxiety, yet it may not be necessary for the subject to actually experience high levels anxiety during the exposure. This is consistent with the effects of systematic desensitization (Wolpe,
1958), in which participants are exposed to anxiety-eliciting stimuli while maintaining a state of relaxation. However, even with systematic desensitization, only those individuals who demonstrate modest levels of initial anxiety benefit from the procedure.

Limitations

This study has a number of limitations. One factor that significantly impacts the ability to assess change over time is identifying appropriate behavioral measures of anxiety. The behavioral avoidance test clearly provides a sample of participant behavior in the presence of the conditioned stimulus. However, there is evidence that learning occurs within the context of the behavioral avoidance task. Specifically, it provides an episode of non-reinforced CS presentation. As a result, participants showed evidence of reduced anxiety as a function of the behavioral avoidance test alone, as evidenced by lower values on one or more dependent variables during the first interval of the intervention. This phenomenon has been noted elsewhere. Foley and Spates (1995) observed improvement across two behavioral avoidance measures in a no-treatment control group that were nearly equal to those observed in the active treatment conditions. They proposed that the improvement may have been due to practice effects or non-specific factors. Practice effects are a problematic complication in the study of treatments for anxiety as measurement itself frequently involves an exposure session.

The high attrition rate was problematic. As noted previously, four of six participants failed to return for follow-up. The lack of follow-up data prohibited...
examination of between session effects of the intervention as well as questions regarding the effects of the intervention on diagnostic status. In addition, because the DEVS was administered at follow-up, data were unavailable regarding the overall aversiveness of the two interventions for most participants. However, the two participants who returned for follow-up (one in each experiment) rated the intervention as very distressing (ratings of 8 on a 1–9 scale with indicating the highest level of distress). Unfortunately, it was not possible to empirically examine other factors that may have contributed to high attrition. Each participant who failed to show for a follow-up session was contacted and rescheduled for at least one additional appointment. At the time of contact, participants were asked about their reasons for not attending follow-up. The response was unanimously that the participant had forgotten the appointment and would like to reschedule.

A number of hypotheses are offered to account for high attrition. First, the sample was drawn from a population of college students, and most of the sessions occurred during the late spring and early summer. Thus, participants may have been less available or less motivated to participate in a research study at this point in time, particularly after already receiving the intervention. One participant who returned was a non-traditional student who was also working full-time at the university. The other participated early in the fall semester and received extra credit points in his class for each hour of participation.

Alternatively, consistent with the available DEVS data, observations of the participants during the intervention suggested that the procedure was aversive. Specifically, several participants vocalized frustration at the instruction to continue
speaking while simultaneously denying anxiety. In fact, for several participants, avoidance ratings increased as anxiety ratings decreased. Thus, participants may have failed to return in order to avoid an aversive task.

While the single-subject methodology has the advantage of allowing more detailed analysis of within-subject change over time, it does not permit direct comparisons of the two interventions. Rather, the design provided a means of evaluating the feasibility of the two interventions separately. A between-groups design, incorporating randomization of subjects to conditions would address the comparative efficacy of the two interventions. However, an intermediate step will be to establish a continuous exposure procedure that is effective across the full range of anxiety symptoms.

Finally, the sample size was relatively small. Replication of the findings with larger and more diverse samples will be important to determine the degree to which the findings are generalizable.

Future Directions

The results of the present study suggest a number of hypotheses to be examined by future research. First, taken together, the results of the two experiments suggest that the dosed exposure preparation is effective in reducing anxiety across a wider range of response domains. However, the two interventions were administered within the context of two separate experiments. Consequently, participants were not randomly assigned to conditions. Likewise, the small sample size rendered power to detect even relatively large effect sizes low. In order to better understand the
comparative efficacy of the two interventions, follow-up with a randomized between
groups design is essential. This is consistent with the original intent in selecting the
design of the present investigation.

Participants were responsible for generating a number of the stimuli to which
they were exposed, specifically those stimuli associated with delivering a speech.
Thus, while the experimenter could prevent escape and avoidance responses to
stimuli such as the presence of an audience and the configuration of the room, the
experimenter could not absolutely control whether the participant spoke or did not
speak. Verbal contingencies were in place via instructions to speak until instructed to
stop and prompts which were administered anytime the participant stopped speaking
spontaneously. However, ultimately participants were able to escape the task briefly
before these prompts could be administered. Future research examining the effects of
continuous and interrupted exposure under conditions in which the researcher has
greater control over stimuli, would help clarify the independent effects of the dosing
arrangement versus the effects of escape during exposure. Previous research has
suggested that when escape behaviors are prevented, continuous and interrupted
exposures produce similar results (Shipley, 1974). However, this finding has not been
extended to extinction in humans.

There were distinct individual differences in terms of reactivity across
response domains. Some participants showed reactivity across all domains, while
others showed individual patterns of reactivity in some domains but not others. This
pattern of individual responsiveness is particularly problematic for between-groups
designs where the effects of the intervention can be washed out by within-group
variability. Future studies can address this problem by selecting participants based on their reactivity profile, as well as via single-subject methodology that permits examination of individual response patterns.

The finding that participants in the dosed exposure intervention did not require activation of heart rate during the exposure intervention to achieve reductions from pre to post intervention is compelling. Perhaps this lower level of reactivity would make exposure more tolerable for participants. Future investigations should specifically address the aversiveness of these interventions.

Finally, future research should address the variables responsible for high attrition. Once the problem of attrition is adequately addressed, the effects of the interventions over time can be examined more thoroughly. Such high attrition problems in exposure-based therapy have been the topic of concern in the behavior therapy literature (Zayfert, 2000) and thus the pattern in the current investigation is consistent.
APPENDIX A

Screening Questionnaire
SCREENING QUESTIONNAIRE

1. Date of birth ________________________________

2. Occupation __________________________________

3. Education in years ____________________________
   Students, please circle one: Fresh  Soph  Junior  Senior  Grad
   Students, please list your Major: ______________________; Minor____________________

4. Please describe any public speaking situations you are anticipating in the next 6 months (e.g.,
   class, wedding, banquet, etc.):

5. Please list any situations you are avoiding due to public speaking (e.g., class you are not
   taking or putting off, event you plan not to attend or are trying to get out of):

6. Have you ever had a history of the following conditions:
   a. Seizure
   b. Neurological Problem
   c. Heart Disease
   d. Lung Disease
   e. Asthma
   f. Recurring Chest Pain
   g. Stroke

7. Within the past 30 days, have you experienced the following conditions:
   a. Ulcer
   b. Migraines

8. Are you taking any medications? Yes No
   If yes, please list medication name, dosage, and length of time taking each:

9. Are any of the above medications taken for anxiety, stress, or to help you cope with public speaking? Yes No

10. Are you currently receiving treatment specifically to help with public speaking? Yes No

11. Do you feel you use drugs or alcohol to help relieve anxiety? Yes No

12. Are you available for one 4½-hour session & one 1-hour session? Yes No

13. Do you want to get rid of your anxiety? Yes No

14. Are you willing and prepared to tolerate some anxiety during treatment? Yes No

64
15. Has there ever been a period of time when you had experiences such as:

- a. Hearing or seeing things that other people didn't notice?  Yes  No
- b. Hearing voices or conversations when no one was around? Yes  No
- c. Seeing visions that no one else saw?  Yes  No
- d. Had the feeling that something odd was going on around you, that people were doing things to test you or antagonize or hurt you so that you felt you had to be on your guard constantly?  Yes  No

* For any yes response to this question, please clarify what the subject's experiences have been (i.e., "Please tell me what you meant when you said you ______.") If the subject's responses suggest evidence of psychotic thinking, contact Dr. Spates immediately for assistance with making a final determination. He will provide additional instructions. In the case of a serious mental illness, you will contact the CMH Access Line or Gryphon Helpline to obtain immediate referral for the subject. Please attend to all instructions provided by these professionals, including communicating the plan to the subject.
APPENDIX B

Informed Consent Document
You have been invited to participate in a research project entitled "A Comparison of Continuous and Dosed Exposure Therapy for Public Speaking Anxiety." This research is intended to study the effects of two different therapies used for treating public speaking anxiety. This project is Stacey Waller's dissertation project.

You will be asked to attend a 30-minute screening session to determine if you are eligible for the rest of the study. If you meet the study criteria, you will be asked to attend two more sessions. The second session will last between 2 and 4 1/2 hours. The third session will last 30 minutes. You will be asked to meet the research assistants for these sessions at the Anxiety Disorders Lab (Suite 2505 Wood Hall, Room 2523).

During the first session you will be asked to respond to 2 questionnaires, the Personal Report of Communication Apprehension - 24 and the Screening Questionnaire. You will also be asked questions from a structured diagnostic interview. It is called the Anxiety Disorders Interview Schedule - IV. On one questionnaire you will be asked to provide general information about yourself (such as age, level of education, employment status, and medical conditions). On the other questionnaire and in the interview you will be asked questions about your experiences with public speaking anxiety. If the results of the questionnaires indicate psychological or medical conditions that would interfere with treatment, you will be excluded from the remainder of the study. Another reason you might be excluded is if your scores on the questionnaires suggest your anxiety level is too low. A therapist referral list is provided with this form that you may use to seek alternate treatment if you are excluded from the study or choose not to participate. Alternate treatments may include individual or group therapy, public speaking courses, or self-help books.

The second session will involve several different procedures. You will be asked to respond to two questionnaires, the Personal Report of Communication Apprehension - 24 and the State-Trait Anxiety Inventory. You will be asked to provide a speech sample for an audience of 3 research assistants, while having your heart rate monitored. After the diagnostic interviewing and questionnaires are completed, you will be randomly assigned to one of the two treatments mentioned above. These are investigational treatments. Both treatments involve speaking, with the assistance of a therapist, in front of a small audience. At the end of the session, you will be asked to complete the questionnaires and speech sample once more. Your heart rate will be monitored throughout the session and you will be asked to provide ratings of the level of distress you experience during treatment.

Initials

67

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
The third session will involve responding to the structured diagnostic interview, two of the questionnaires you completed earlier, and a third questionnaire called the Distress Evaluation Scale. You will also be asked to provide a speech sample for the last time.

Treatments and speech samples will be videotaped. Trained observers will review these videotapes in order to analyze their content. They will be using a rating scale called the Timed Behavioral Checklist. You will not be required to attend additional sessions for these purposes.

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 experience anxiety during the speech samples or treatment; however, the research assistant is prepared to provide crisis counseling should you become significantly upset and s/he is prepared to make a referral if you need further counseling about this topic. You will be responsible for any cost of therapy if you choose to pursue it.

One way in which you may benefit from this activity is to reduce or eliminate the symptoms of anxiety you experience when speaking in public. Furthermore, others who experience anxiety may benefit from the knowledge that is gained from this research. Once the study is completed, you may receive a general summary of the results if you wish. If you wish to receive this summary, please ask the research assistant today or contact the researchers at the numbers below in the future.

You may also be able to earn extra credit points in one of your psychology classes, if your instructor offers this option. You may earn one hour of extra credit for attending the first session, 4 hours for the second session, and one hour for the third session. Your instructor will determine the point value for each hour based on his/her grading scale for the class. If you withdraw from the study, you will earn all of the possible points for all sessions attended up to and including the session during which you withdraw. For example, if you withdraw during or after session 1, you will earn one hour, if you withdraw during or after session 2, you will earn 5 hours, or if you withdraw during session 3, you will earn 6 hours. Your instructor will offer alternative ways to earn extra credit points if you choose not to participate.

All of the information collected from you is confidential. That means that your name will not appear on any papers on which information is recorded. The forms will all be coded, and the researcher will keep a separate master list with the names of__

Initials

68
participants and the corresponding code numbers. 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 in the principal investigator's office. All videotapes will be kept confidential. Your name will not appear on the videotape. Videotapes will be kept in a locked cabinet in the principal investigator's office. Videotapes will only be viewed by trained research assistants. Once these research assistants have finished scoring the videotapes, the videotapes will be destroyed.

You may choose not to participate in this particular treatment. Alternative treatments, such as private counseling, public speaking courses, or self-help books are offered in many communities, and you may wish to explore these options independently of this study. You may refuse to participate or quit at any time during the study without prejudice or penalty. Choosing not to participate will have no effect on your course grade. If you have any questions or concerns about this study, you may contact either Stacey Waller at 616-387-4332 or C. Richard Spates at 616-387-4329. You may also contact the chair of Human Subjects Institutional Review Board at 387-8293 or the vice president for research at 387-8298 with any concerns that you have.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board as indicated by the stamped date and signature of the board chair in the upper right corner. You should not sign this document if the corner does not have a stamped date and signature.

Your signature below indicates that you have read and/or had explained to you the purpose and requirements of the study and that you agree to participate.

_________________________________________  _________________________
Signature                    Date

Consent obtained by: ______________________ (Initials of Research Assistant)
APPENDIX C

Human Subjects Institutional Review Board Approval
Date: October 31, 2002

To: C, Richard Spates, Principal Investigator
   Stacey Waller, Student Investigator for dissertation

From: Mary Lagerwey, Chair

Re: HSIRB Project Number 02-08-12

This letter will serve as confirmation that your research project entitled “A Comparison of Continuous and Dosed Exposure Therapy for Public Speaking Anxiety” 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: August 21, 2003
APPENDIX D

Raw Score Values for Data Presented in Figures 1 through 8
Table 3. Subjective Units of Discomfort Raw Score Values for Subjects Across Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Subject 1</th>
<th>Subject 2</th>
<th>Subject 3</th>
<th>Subject 4</th>
<th>Subject 5</th>
<th>Subject 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 1</td>
<td>Prep</td>
<td>50</td>
<td>60</td>
<td>30</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Speech</td>
<td>75</td>
<td>90</td>
<td>45</td>
<td>80</td>
<td>15</td>
</tr>
<tr>
<td>Baseline</td>
<td>20</td>
<td>10</td>
<td>10</td>
<td>30</td>
<td>10</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>0</td>
<td>5</td>
<td>25</td>
<td>10</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>0</td>
<td>5</td>
<td>25</td>
<td>11</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>10</td>
<td>--</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>5</td>
<td>--</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>0</td>
<td>--</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>5</td>
<td>--</td>
<td>--</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>0</td>
<td>--</td>
<td>--</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>0</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>Education and Instruction</td>
<td>10</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0</td>
<td>20</td>
<td>50</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>80</td>
<td>15</td>
<td>50</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Treatment</td>
<td>50</td>
<td>75</td>
<td>20</td>
<td>50</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>50</td>
<td>20</td>
<td>50</td>
<td>15</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>10</td>
<td>25</td>
<td>50</td>
<td>15</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>--</td>
<td>20</td>
<td>40</td>
<td>--</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>--</td>
<td>15</td>
<td>30</td>
<td>--</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>--</td>
<td>20</td>
<td>25</td>
<td>--</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>--</td>
<td>--</td>
<td>25</td>
<td>--</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>--</td>
<td>--</td>
<td>25</td>
<td>--</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>--</td>
<td>--</td>
<td>25</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>--</td>
<td>--</td>
<td>25</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>5</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>BAT 2</td>
<td>Prep</td>
<td>10</td>
<td>30</td>
<td>10</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Speech</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>BAT 3</td>
<td>Prep</td>
<td>--</td>
<td>--</td>
<td>30</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Speech</td>
<td>--</td>
<td>--</td>
<td>35</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>
Table 4. Peak Subjective Units of Discomfort Raw Score Values for Subjects Across Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Subject 1</th>
<th>Subject 2</th>
<th>Subject 3</th>
<th>Subject 4</th>
<th>Subject 5</th>
<th>Subject 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 1 Prep</td>
<td>60</td>
<td>70</td>
<td>40</td>
<td>50</td>
<td>11</td>
<td>40</td>
</tr>
<tr>
<td>Speech</td>
<td>75</td>
<td>95</td>
<td>60</td>
<td>90</td>
<td>20</td>
<td>97</td>
</tr>
<tr>
<td>Baseline</td>
<td>20</td>
<td>30</td>
<td>15</td>
<td>30</td>
<td>10</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>0</td>
<td>20</td>
<td>25</td>
<td>10</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>0</td>
<td>10</td>
<td>40</td>
<td>11</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>10</td>
<td>--</td>
<td>15</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>5</td>
<td>--</td>
<td>15</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>5</td>
<td>--</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>5</td>
<td>--</td>
<td>--</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>0</td>
<td>--</td>
<td>--</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>0</td>
<td>--</td>
<td>--</td>
<td>9</td>
</tr>
<tr>
<td>Education and Instruction</td>
<td>30</td>
<td>0</td>
<td>20</td>
<td>25</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>0</td>
<td>20</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>0</td>
<td>25</td>
<td>50</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>80</td>
<td>20</td>
<td>50</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Treatment</td>
<td>50</td>
<td>90</td>
<td>30</td>
<td>50</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>70</td>
<td>20</td>
<td>60</td>
<td>20</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>20</td>
<td>25</td>
<td>50</td>
<td>20</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>--</td>
<td>20</td>
<td>50</td>
<td>--</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>50</td>
<td>--</td>
<td>20</td>
<td>50</td>
<td>--</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>--</td>
<td>20</td>
<td>40</td>
<td>--</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>--</td>
<td>--</td>
<td>25</td>
<td>--</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>--</td>
<td>--</td>
<td>25</td>
<td>--</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>--</td>
<td>--</td>
<td>25</td>
<td>--</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>--</td>
<td>--</td>
<td>25</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>15</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>BAT 2 Prep</td>
<td>10</td>
<td>20</td>
<td>10</td>
<td>0</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Speech</td>
<td>20</td>
<td>40</td>
<td>20</td>
<td>0</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>BAT 3 Prep</td>
<td>--</td>
<td>--</td>
<td>45</td>
<td>--</td>
<td>--</td>
<td>15</td>
</tr>
<tr>
<td>Speech</td>
<td>--</td>
<td>--</td>
<td>60</td>
<td>--</td>
<td>--</td>
<td>20</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Table 5. Mean Heart Rate Raw Score Values for Subjects Across Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>BAT 1 Prep</td>
<td>71</td>
<td>92</td>
<td>71</td>
<td>91</td>
<td>68</td>
<td>81</td>
</tr>
<tr>
<td>Speech</td>
<td>87</td>
<td>118</td>
<td>82</td>
<td>98</td>
<td>84</td>
<td>89</td>
</tr>
<tr>
<td>Baseline</td>
<td>80</td>
<td>91</td>
<td>94</td>
<td>91</td>
<td>83</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>83</td>
<td>94</td>
<td>94</td>
<td>86</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>85</td>
<td>92</td>
<td>94</td>
<td>94</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>93</td>
<td>94</td>
<td>--</td>
<td>82</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>91</td>
<td>94</td>
<td>--</td>
<td>82</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>89</td>
<td>94</td>
<td>--</td>
<td>81</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>88</td>
<td>--</td>
<td>--</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>87</td>
<td>--</td>
<td>--</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>87</td>
<td>--</td>
<td>--</td>
<td>75</td>
</tr>
<tr>
<td>Education and Instruction</td>
<td>66</td>
<td>79</td>
<td>68</td>
<td>86</td>
<td>62</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td>67</td>
<td>76</td>
<td>83</td>
<td>85</td>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>69</td>
<td>76</td>
<td>70</td>
<td>84</td>
<td>67</td>
<td>72</td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>99</td>
<td>69</td>
<td>84</td>
<td>68</td>
<td>71</td>
</tr>
<tr>
<td>Treatment</td>
<td>88</td>
<td>115</td>
<td>81</td>
<td>87</td>
<td>76</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>82</td>
<td>103</td>
<td>91</td>
<td>88</td>
<td>75</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>81</td>
<td>98</td>
<td>89</td>
<td>89</td>
<td>76</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>82</td>
<td>--</td>
<td>90</td>
<td>87</td>
<td>--</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>--</td>
<td>89</td>
<td>86</td>
<td>--</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>85</td>
<td>--</td>
<td>89</td>
<td>86</td>
<td>--</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>88</td>
<td>--</td>
<td>--</td>
<td>88</td>
<td>--</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>85</td>
<td>--</td>
<td>--</td>
<td>86</td>
<td>--</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>84</td>
<td>--</td>
<td>--</td>
<td>86</td>
<td>--</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>88</td>
<td>--</td>
<td>--</td>
<td>86</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>93</td>
<td>--</td>
<td>--</td>
<td>87</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>86</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>BAT 2 Prep</td>
<td>68</td>
<td>90</td>
<td>95</td>
<td>79</td>
<td>65</td>
<td>79</td>
</tr>
<tr>
<td>Speech</td>
<td>89</td>
<td>99</td>
<td>90</td>
<td>86</td>
<td>78</td>
<td>84</td>
</tr>
<tr>
<td>BAT 3 Prep</td>
<td>--</td>
<td>--</td>
<td>69</td>
<td>--</td>
<td>--</td>
<td>70</td>
</tr>
<tr>
<td>Speech</td>
<td>--</td>
<td>--</td>
<td>83</td>
<td>--</td>
<td>--</td>
<td>77</td>
</tr>
</tbody>
</table>

75

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Table 6. Peak Heart Rate Raw Score Values for Subjects Across Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Subject 1</th>
<th>Subject 2</th>
<th>Subject 3</th>
<th>Subject 4</th>
<th>Subject 5</th>
<th>Subject 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 1 Prep</td>
<td>75</td>
<td>98</td>
<td>71</td>
<td>97</td>
<td>70</td>
<td>80</td>
</tr>
<tr>
<td>Speech</td>
<td>99</td>
<td>130</td>
<td>88</td>
<td>101</td>
<td>93</td>
<td>94</td>
</tr>
<tr>
<td>Baseline</td>
<td>94</td>
<td>101</td>
<td>94</td>
<td>96</td>
<td>88</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>88</td>
<td>102</td>
<td>94</td>
<td>101</td>
<td>89</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td>94</td>
<td>101</td>
<td>94</td>
<td>99</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>102</td>
<td>94</td>
<td>--</td>
<td>87</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>100</td>
<td>94</td>
<td>--</td>
<td>88</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>94</td>
<td>--</td>
<td>--</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>87</td>
<td>--</td>
<td>--</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>87</td>
<td>--</td>
<td>--</td>
<td>88</td>
</tr>
<tr>
<td>Education and Instruction</td>
<td>78</td>
<td>90</td>
<td>69</td>
<td>92</td>
<td>70</td>
<td>78</td>
</tr>
<tr>
<td>Treatment</td>
<td>83</td>
<td>96</td>
<td>90</td>
<td>95</td>
<td>72</td>
<td>83</td>
</tr>
<tr>
<td></td>
<td>83</td>
<td>83</td>
<td>90</td>
<td>89</td>
<td>75</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>110</td>
<td>69</td>
<td>89</td>
<td>76</td>
<td>81</td>
</tr>
<tr>
<td>BAT 2 Prep</td>
<td>72</td>
<td>99</td>
<td>95</td>
<td>86</td>
<td>70</td>
<td>86</td>
</tr>
<tr>
<td>Speech</td>
<td>97</td>
<td>104</td>
<td>90</td>
<td>93</td>
<td>83</td>
<td>94</td>
</tr>
<tr>
<td>BAT 3 Prep</td>
<td>--</td>
<td>--</td>
<td>73</td>
<td>--</td>
<td>--</td>
<td>78</td>
</tr>
<tr>
<td>Speech</td>
<td>--</td>
<td>--</td>
<td>87</td>
<td>--</td>
<td>--</td>
<td>83</td>
</tr>
</tbody>
</table>
Table 7. Avoidance Rating Raw Score Values for Subjects Across Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 1</td>
<td>Prep</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Speech</td>
<td>6</td>
<td>8</td>
<td>7</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Baseline</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>3</td>
<td>--</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>2</td>
<td>--</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>0</td>
<td>2</td>
<td>--</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>--</td>
<td>--</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>2</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>2</td>
<td>--</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td>Education and Instruction</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>8</td>
<td>5</td>
<td>8</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Treatment</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>--</td>
<td>5</td>
<td>5</td>
<td>--</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>--</td>
<td>4</td>
<td>5</td>
<td>--</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>--</td>
<td>4</td>
<td>4</td>
<td>--</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>--</td>
<td>--</td>
<td>4</td>
<td>--</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>--</td>
<td>--</td>
<td>4</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>--</td>
<td>--</td>
<td>4</td>
<td>--</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>BAT 2</td>
<td>Prep</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Speech</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>BAT 3</td>
<td>Prep</td>
<td>--</td>
<td>--</td>
<td>4</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Speech</td>
<td>--</td>
<td>--</td>
<td>4</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Table 8. Timed Behavioral Checklist Raw Score Values for Subjects Across Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAT 1</td>
<td>Speech</td>
<td>7.33</td>
<td>7.67</td>
<td>4.33</td>
<td>4.67</td>
<td>6.67</td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td>7.33</td>
<td>5.67</td>
<td>5.00</td>
<td>4.33</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.00</td>
<td>5.67</td>
<td>4.33</td>
<td>3.67</td>
<td>6.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.00</td>
<td>7.67</td>
<td>5.00</td>
<td>3.00</td>
<td>5.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.33</td>
<td>--</td>
<td>4.67</td>
<td>4.00</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.33</td>
<td>--</td>
<td>5.00</td>
<td>4.67</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.00</td>
<td>--</td>
<td>5.00</td>
<td>5.00</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.33</td>
<td>--</td>
<td>--</td>
<td>4.67</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.00</td>
<td>--</td>
<td>--</td>
<td>5.67</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.67</td>
<td>--</td>
<td>--</td>
<td>6.33</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.00</td>
<td>--</td>
<td>--</td>
<td>5.67</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>6.00</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>5.67</td>
<td>--</td>
</tr>
<tr>
<td>BAT 2</td>
<td>Speech</td>
<td>8.33</td>
<td>7.67</td>
<td>4.67</td>
<td>4.00</td>
<td>6.67</td>
</tr>
<tr>
<td>BAT 3</td>
<td>Speech</td>
<td>--</td>
<td>--</td>
<td>3.00</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
REFERENCES


depression: Distinctive and overlapping features (pp. 413-454). New York: Academic Press.


83


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.


87


