

Minnesota State University, Mankato
**Cornerstone: A Collection of Scholarly and Creative
Works for Minnesota State University, Mankato**

Masthead Logo

All Theses, Dissertations, and Other Capstone
Projects

Theses, Dissertations, and Other Capstone Projects

2019

Comparison Between Brief Acceptance and Cognitive Interventions: Assessing Public Speaking Performance in Socially-Anxious Individuals

Soultana Mpoulkoura
Minnesota State University, Mankato

Follow this and additional works at: <https://cornerstone.lib.mnsu.edu/etds>

Part of the [Clinical Psychology Commons](#)

Recommended Citation

Mpoulkoura, Soultana, "Comparison Between Brief Acceptance and Cognitive Interventions: Assessing Public Speaking Performance in Socially-Anxious Individuals" (2019). *All Theses, Dissertations, and Other Capstone Projects*. 940.
<https://cornerstone.lib.mnsu.edu/etds/940>

This Thesis is brought to you for free and open access by the Theses, Dissertations, and Other Capstone Projects at Cornerstone: A Collection of Scholarly and Creative Works for Minnesota State University, Mankato. It has been accepted for inclusion in All Theses, Dissertations, and Other Capstone Projects by an authorized administrator of Cornerstone: A Collection of Scholarly and Creative Works for Minnesota State University, Mankato.

Comparison Between Brief Acceptance and Cognitive Interventions: Assessing Public Speaking
Performance in Socially-Anxious Individuals

by

Soultana Mpoulkoura

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

In

Clinical Psychology

Minnesota State University, Mankato

Mankato, Minnesota

May 8th, 2019

May 8th, 2019

Comparison Between Brief Acceptance and Cognitive Interventions: Assessing Public Speaking Performance in Socially-Anxious Individuals

Soultana Mpoulkoura

This thesis has been examined and approved by the following members of the student's thesis committee.

Advisor Jeffrey Buchanan, Ph.D.

Committee Member Kari Much, Psy.D.

Committee Member Bradley Arsznov, Ph.D.

Dedication

Creating this thesis have a been a delightful and rewarding experience. From the first part until the last has been an enjoyable and informative endeavor. All of this project would not have been possible without the people who inspired me and guided me along the way. First, I would like to thank my advisor, Dr. Jeffrey Buchanan, who with his guidance and knowledge created an easy path for me to follow and made every step in the process incredibly clear. I would also like to thank Mr. Samuel Spencer, who helped and guided me in extending his study, with his endless guidance, feedback, and insightful comments, in the stages of experimental design and data analysis. The study would have not been as well-created without the help and understanding of my entire committee.

I would also like to thank all the students who participated in this study, both, as research assistants and as participants. This project would not have been possible without the tireless efforts of faculty and without the undergraduate students on our research team.

On a personal note, I would like to take a moment to thank my dear husband Louis for his endless support, patience, and love throughout my academic career. I would not have been here if not for his efforts. I would like to dedicate this thesis to my kids, Fotini and Andreas, who with their support and understanding made me to strive achieve excellence in academia and beyond. I only hope I am and I will be the role model they always wanted to have.

Abstract

Social anxiety disorder is one of the most prevalent psychological disorder to date and it is associated with impairments in multiple domains, such as in occupational and academic settings. Although, traditional Cognitive Behavioral Therapy (CBT), aims to reduce distress by altering maladaptive schemas, this approach is not always successful. Recent research has shown ambiguous support for cognitive restructuring as a mechanism of change. Therefore, further research is needed to discover effective treatments. Acceptance and Commitment Therapy (ACT), emphasizes psychological flexibility and values rather controlling negative thoughts. The current study compared brief acceptance and cognitive control based interventions for increasing performance on a public speaking task. It was hypothesized that participants in CBT and ACT conditions will exhibit greater reduction of anxiety following the speech task compared to the psychoeducational control group. It was also hypothesized that the acceptance based intervention will lead to greater increases in performance compared to other two protocols. Participants were college students at a Midwestern public university and were then randomized to receive an acceptance, cognitive-control, or psychoeducational-based protocol. Participants then prepared and gave 5-minute autobiographical speech in front of an audience of two research assistants. Results indicated that participants in either ACT, CBT, or Control conditions did not significantly differ in public speaking performance, nor did differ on physiological anxiety, subjective distress and experiential avoidance. These findings promote the utility of brief interventions and promote the importance of continuing to develop techniques that increase public speaking performance.

Keywords: Acceptance-based interventions, Cognitive-based interventions, ACT, CBT, public speaking anxiety, social anxiety.

Table of Contents

Table of Contents	
Introduction	6
Method	12
Results	19
Discussion	22
References	28
Tables	
1. Overall Means for Dependent Variables.....	35
2. Means by Dependent Variables by Condition.....	36
3. Participant Ratings of Intervention.....	36
4. Participant Ratings of Public Speaking Task.....	36
Figures	
1. Experiment flow chart.....	37
2. Participant AAQII ratings.....	38
3. Participant SUDS ratings.....	38
4. Participant BPM ratings.....	39
Appendices	
A. Participant recruitment email.....	40
B. Participant Demographics.....	41
C. Spielberger State-Trait Anxiety Inventory.....	42
D. Acceptance and Action Questionnaire-II.....	43
E. Speech Performance Scale.....	44
F. CBT intervention protocol.....	45
G. ACT intervention protocol.....	49
H. Psychoeducational intervention protocol.....	53
I. Participant speech instructions.....	56
J. Confederate instructions.....	57
K. Informed consent form.....	58
L. Post-speech survey.....	60
M. Debriefing form.....	61

Comparison Between Brief Acceptance and Cognitive Interventions: Assessing Public Speaking Performance in Socially-Anxious Individuals

Fear of public speaking is prevalent in American society. The prevalence of public speaking anxiety (PSA) in the general population ranges from 25% to 85% (Glassman & Foreman, 2016; Russio et al., 2008). Public speaking is the most common lifetime social fear and at clinical levels, PSA is diagnosed as social phobia (England et al., 2012; Glassman & Foreman, 2016). Social phobia, also known as social anxiety disorder, is a condition marked involving marked anxiety about social or performance situations in which there is a fear of embarrassing oneself under scrutiny by other (Ruscio, Brown, Chiu, Sareen, Stein, & Kessler, 2008). Socially anxious individuals tend to avoid situations where they assume they will be perceived by others unfavorably (Craske et al., 2014; Eifert & Forsyth, 2005).

Public speaking anxiety is connected with higher rates of unemployment, lower income, and reduced likelihood of completing a college education compared to the general population of the United States (Cunningham, Lefkoe, & Sechrest, 2006; England et al, 2012). Public speaking anxiety is often the primary reason of non-advancement in someone's career (Cunningham et al., 2006). Individuals with public speaking anxiety also experience significant distress and impairment in their education, work, and social life (England, Herbert, Forman, Rabin, Juarascio, & Goldstein, 2012).

Cognitive Behavioral Approaches

To date, a growing body of literature has focused on theoretical implications for intervention and prevention of disorders (Block, 2003). Cognitive theory asserts that information processing is vital for human adaptation and survival. The cognitive system is tied to other affective, behavioral, and motivational repertoires (Beck, & Dozois, 2011). Each of these repertoires serves as a single function and operates in synchrony toward goal-oriented strategies.

Cognitive-behavioral therapists have developed an information-processing model, whereby hypothesized cognitive structures, or schemas, are causally involved in the development of psychopathology (Block & Wulfret, 2000). Cognitive behavioral therapy, therefore, focuses on identifying, modifying, and ultimately replacing these maladaptive cognitive structures (Glassman et al., 2016; Block & Wulfret, 2000).

Cognitive behavioral therapy is described as an active, collaborative, current-problem oriented treatment that combines both, cognitive and behavioral principles to lessen distress and reduce clinical symptoms (Herbert & Foreman, 2009). With regard to PSA, cognitive theories suggest that anxiety may be maintained because of the importance the individual places on being positively received by others and fears that one will be negatively judged and scrutinized by others (Rapee & Heimberg, 1997). Action theory is a part of the comprehensive model of cognitive theory concerning social anxiety. The action theory gives an emphasizes cognitive processes that are relevant to a goal attainment. The goal achieved by an individual defines the demands of an event and also cognition and behavior in a certain way (Hoffman, 2007). When individuals with this disorder attend a social event they monitor and observe themselves constantly (Hoffman, 2007).

Outcome research suggests that 50% of persons with social anxiety can benefit from CBT (Craske et al., 2014; Hoffman, 2007). However, although CBT is quite effective, many patients do not show benefits (Craske et al., 2014; Gould, 1997). Little and Simson (2000) argue that CBT works because clients learn to alter the form and/or frequency of negative thinking patterns. However, recently some have argued that there is limited evidence that changes in the form or frequency of negative cognitions accounts for the positive treatment effects associated with CBT (Hayes, 2004; Craske et al., 2014), which calls into question the proposed mechanisms of change

postulated by cognitive-behavioral theorists. Consequently, acceptance-based approaches rooted in behavior analytic theories of language and cognition have been developed to address these shortcomings associated with traditional CBT (Hayes, 2004; Craske et al., 2014).

Acceptance and Commitment Therapy

One of these acceptance-based treatment approaches is Acceptance and Commitment Therapy (ACT). ACT includes a number of methods that are designed to help individuals experience aversive private events (e.g., anxiety, self-defeating thoughts) without engaging in ineffective behaviors intended to terminate these aversive private events (e.g., drinking, avoiding social situations; Hofmann, 2007; Rapee & Heimberg, 1997). One of these methods is called cognitive defusion, and is designed to address the harmful effect of cognitive fusion, which refers to the connection between language and behavioral domination. An individual with PSA might have a self-evaluation and have thoughts that one is bad or is unlovable (Hayes, Levin, Plumb-Viladarga, Villate, & Pistorello, 2013). Fusion might not be harmful in a general sense, but it can be harmful when individuals take their thoughts literally without considering the process of thinking by itself (Hayes et al., 2013). ACT also address the role of that experiential avoidance, which is an attempt to change or avoid internal experiences, such as thoughts, feelings, or bodily sensations even when this avoidance is very costly (Heyes et al., 2013). ACT contends that experiential avoidance is important in maintaining psychological disorders such as social phobia (Block & Wulfert, 2000). For example, socially anxious individuals may focus on unpleasant internal events such as thoughts and feelings and try to change them using strategies similar to those they use when attempting to change external events (e.g., try to control negative thoughts by ignoring them or changing the way one thinks; avoid social situations). Avoidance of unpleasant situations, emotions, and thoughts can restrict one's life in important ways, which

in turn can lead to loss of social or occupational opportunities and ultimately, result in emotional isolation (Hayes, Wilson, & Strosahl, 1999).

Ultimately, the goal of ACT is to discourage avoidance and foster psychological flexibility such that an individual is able to make decisions and engage in actions according to one's values as opposed to behavior being motivated primarily by avoidance of aversive situations and private events (Hayes, 2008). Acceptance and Commitment Therapy, therefore, emphasizes psychological acceptance and the reduction of emotional avoidance as the primary mechanisms of change rather than altering cognitive content.

Literature Review

In terms of treating social anxiety, and in particular PSA, both CBT and ACT have produced beneficial results (Ruiz, 2012; Craske et al., 2014). However, only a small literature has directly compared change-oriented therapies such as CBT and acceptance-oriented therapies such as ACT for reducing social anxiety. Glassman, Foreman, Herbert, Bradley, Foster, Izzetoglou, & Ruocco (2016) completed one such study designed to increase public speaking performance. This study also investigated neurophysiological changes associated with each treatment. Results indicated that the differences between these two interventions in terms of reducing public speaking anxiety and improving performance were marginal. In addition, individuals who received a 90-minute ACT intervention had significantly lower levels of blood volume in their left dorsolateral prefrontal cortex, compared to those who received a CBT intervention of similar length and structure (Glassman et al., 2016). These results suggest that trying to control thoughts may negatively affect public speaking performance because cognitive resources are devoted to controlling negative thoughts, feelings, and bodily sensations while trying to perform a behavior such as giving a speech (Glassman et al., 2016).

Spencer (2017) compared CBT and ACT in relation to public speaking anxiety in a sample of 42 socially anxious college students. The study implemented brief, 15-20 minute acceptance and cognitive-based interventions. The interventions were designed to prepare participants for a public speaking task. Results of this study indicated that although there were no significant differences between the CBT and ACT conditions, participants in ACT condition exhibited less distress during the public speaking task (Spencer 2017, *unpublished thesis*). In addition, individuals in the ACT condition exhibited significantly lower experiential avoidance compared to participants in the CBT condition (Spencer 2017, *unpublished thesis*), which provided some evidence that ACT produced benefits consistent with its proposed mechanism of change.

Purpose of Current Study

This study contributes to the extant literature by investigating the use of brief acceptance, cognitive, and psychoeducational-control based interventions for increasing public speaking performance. Both control-based and acceptance-based interventions have been shown to decrease PSA, but it is unclear which treatment may produce greater benefits with regard to public speaking performance. The effects of treatment on public speaking performance may be a key differentiator of these two treatments because although reducing anxiety is an important outcome, improving public speaking performance is arguably more important. Therefore, it is important to investigate the differential effects of acceptance- and cognitive-based interventions for increasing performance as well as decreasing anxiety associated with public speaking. Therefore, the primary goal of this study was to compare brief acceptance- and cognitive-based, interventions for increasing public speaking performance in social anxious individuals. This study expanded Spencer's (2017) study described previously. The current study compares the

differential effects these interventions have on anxiety and it evaluates the differential effects of the interventions on public speaking performance. The current study expands upon previous research by including: 1) a psychoeducational control group, and 2) physiological measurement to investigate how the different interventions impact physiological responses consistent with anxiety (i.e., heart rate).

Given previous literature and the purposes of the current study, several hypotheses were proposed. The current study hypothesized that participants in CBT and ACT conditions will exhibit greater reduction in anxiety following the speech task in comparison to no treatment, control group. This hypothesis is based on existing research that has shown that both treatments are equally effective for reducing anxiety (Craske et al., 2014; Forman et al., 2007). A second hypothesis is that participants receiving either an ACT or CBT protocol will have greater public speaking performance than the Control group. This hypothesis is based on Goldfarb (2009), which found that individuals in both conditions had greater public speaking performance than the control group. Third, it is hypothesized that participants in the ACT protocol will show less avoidance post-intervention than participants in the CBT group, or participants in the control group. This hypothesis is based on Glassman et al. (2016), which found that individuals in the ACT condition had more available cognitive resources than individuals in CBT condition, which lead to superior public speaking performance. The fourth hypothesis is that Participants in the control condition will have higher subjective distress during and after the task compared to other two groups. This hypothesis is intended to be a process measure of mechanism of action in ACT which provides that reductions in distressing thoughts is not the main focus of change (Hayes, 2004). The fifth hypothesis is that participants in the control condition will have higher physiological anxiety (Fitbit) levels during and after the task compared to other two groups. This

hypothesis also investigates the mechanism of action proposed by ACT in that instructions to accept one's distress and negative feelings may lead to greater distress because less effort will be devoted to decrease anxiety while more effort will be devoted to attending to the immediate experience of anxiety (Hayes et al., 2013). Furthermore, it is expected that participants in the control condition will have higher anxiety during and after the public speaking task compared to other two groups given that no specific coping mechanisms will be provided to those in the control group.

Method

The experimental design utilized in this current study involved random assignment of participants to receive either an acceptance-based, cognitive-control-based, or psychoeducational control intervention. Following completion of the assigned intervention, participants prepared, and then delivered, a five-minute autobiographical speech. Speeches were videotaped for and were later analyzed to determine level of performance. The experimental design was a partial replication of a studies completed by Spencer (2017) and Goldfarb (2009).

Participants

Participants in this study were undergraduate college students from a Midwestern public university. Three hundred forty-nine students completed prescreening measures to determine the severity of public speaking anxiety. Ninety of these individuals (26%) met the inclusion criteria and were subsequently contacted via email to participate to the in-person part of the study. In total, 38 individuals (42%) participated in the in-person part of the study. Among this sample, 36 were women (95%), 23 indicated that they were first-year college students (61%), 29 reported their ethnicity as "Caucasian" (76%), and 26 were nineteen years of age or younger (69%).

Prescreening Measures

After the participants went through the consent procedure, participants completed a prescreening survey via the SONA online survey management tool. The online prescreening survey included measures of social anxiety as well as fear of public speaking.

Social phobia. The Social Phobia Scale (SPS; Mattick & Clarke, 1998) is a 20-item self-report measure of anxiety and distress regarding being observed by others in social situations. The SPS consists of 20 items measured on a 5-point Likert scale from 0 indicating “*Not at all characteristic or true of me,*” to 4 indicating “*Extremely characteristic or true of me.*” The SPS total score can range from 0 to 80, with higher scores indicative of greater social anxiety. The SPS demonstrated high levels of test-retest reliability ($\alpha = .91$), internal consistency ($\alpha = .89$), and exhibited a positive association with other measures of social anxiety (Mattick & Clarke, 1998). For a participant to be eligible for the in-person portion of the study, they had to score above the cutoff score of 20 (Goldfarb, 2009; Block & Wulfert, 2000; Spencer, 2017), which indicates at least moderate levels of social anxiety. The SPS scores from the current study yielded a range of 20-61, ($M=36.42$, $SD=11.50$).

Fear and avoidance related to public speaking. The second prescreening measure contained two items from the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987). Two items from this instrument were used to rate participant’s level of fear and avoidance in relation to public speaking. The first item asked participants to rate their level of fear using a 4-point Likert Scale ranging from 0 (*none*), 1 (*mild*), 2 (*moderate*), to 3 (*severe*). The second item asked participants to rate their level of avoidance regarding public speaking, using also a 4-point Likert Scale ranging from 0 (*never*), 1 (*occasionally*), 2 (*often*), to 3 (*usually*). In the current study, 37% of participants reported “usually” avoiding public speaking situations, and 34% endorsed a

“severe” level of fear regarding public speaking. Inclusion criteria required participants to rate at least a “moderate” level of fear and “occasional” avoidance of public speaking situations, criteria that were also used by Goldfarb (2009).

Pre- and Post-Speech Outcome Measures

Participant were asked to complete a demographic survey as well as a series of outcomes measures both prior to giving and speech and after the speech. These measures will be describe in detail below.

State anxiety. The Spielberger State Anxiety Inventory (SSAI; Spielberger, 1983) is a 20-item, self-report instrument used to measure an individual’s current level, or state, of anxiety. Items are rated on a Likert scale with 1 indicating “*Not at all,*” and 4 meaning “*Very much so*”. with 10 of the items being reverse-scored. The SSAI’s composite score consists of the sum of 20 items, ranging from 20 to 80. Higher scores signify greater anxiety. Previous research has shown that the SSAI demonstrated good test-retest reliability ($\alpha=.65-.75$), good internal consistency ($\alpha =.86-.95$), and evidence of sufficient concurrent and construct validity (Speilberger & Vagg, 1984).

State distress. The Subjective Units of Discomfort Scales (SUDS; Wolpe & Lazarus, 1966) are a self-report, subjective measure of the amount of state distress one is experiencing at a given moment. SUDS ratings are reported on a scale of 0 – 100, with 0 representing “*No distress,*” and 100 representing “*The most conceivable distress.*” Tanner (2012) found that SUDS ratings demonstrated outstanding convergent validity with clinician ratings of patient distress.

Psychological inflexibility. The Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011) is a seven-item, self-report measure of psychological inflexibility and experiential

avoidance. The AAQ-II consists of seven statements that individuals report on a Likert scale of 1-7, with 1 meaning “*Never true,*” and 7 meaning “*Always true.*” The AAQ-II composite score consists of the sum of all seven items, ranging from 10 to 42. Higher scores suggest greater psychological inflexibility and experiential avoidance. Bond and his colleagues found that the AAQ-II demonstrated good content validity ($\alpha=.84$), as well as adequate internal consistency ($\alpha=.80$) and test-retest reliability ($\alpha=.81, .79$). Bond et al., (2011) also found that clinical samples typically yielded AAQ-II scores from 24-28, whereas non-clinical samples yielded AAQ-II typically had scores from 18-19.

Speech performance. The Perception of Speech Performance (PSP; Rapee & Lim, 1992) is a 17-item self- or other-report rating of the perception of public speaking performance. The PSP consists of 12 specific behavioral items (*i.e., “Had long pauses; Fidgeted”*) and 5 global items (*i.e., Appeared nervous; Made a good overall impression*). Items were rated on a Likert scale with 0 meaning “*Not at all,*” and 4 meaning “*Very much.*” A few items are reverse-scored, and previous research has conventionally combined the specific and global items to form a collective score (Glassman et al., 2016; Rapee & Lim, 1992). Higher scores signify worse speech performance. The PSP has been found to have sufficient levels of internal consistency with a Cronbach’s α of .79 (Rapee & Heimberg, 1997; Rapee & Lim, 1992).

Two research assistants, who were blinded to participant condition, rated the video recordings of each participant’s speech using the PSP. One research assistant served as the primary rater, while a second rater evaluated 30% of the videos to provide a measure of interobserver agreement (IOA). Both research assistants underwent extensive training from the first author about how to evaluate the speeches. IOA as calculated using a Pearson product moment correlation coefficient was .41.

Apparatus

Heart rate was measured as a means of assessing physiological arousal/anxiety. Heart rate (i.e., beats per minute; bpm), was measured using a portable Fitbit. The Fitbit was placed on the participant after the consent process was completed and was removed after post-speech questionnaires were completed. Heart rate data then were analyzed included peak bpm prior to giving the speech, during the speech, as well as following the speech.

Procedures

All study procedures were approved by the University's Institutional Review Board. Participants first completed the online pre-screening surveys described above. Eligible participants were then invited to participate in the in-person part of the study. After completing the informed consent process and being fitted with the Fitbit, participants were randomly assigned to receive either an acceptance-based, a cognitive-based, or psychoeducational-based intervention. Prior to participating to the assigned condition, participants completed the self-report measures of state anxiety, subjective level of psychological distress, and psychological inflexibility/emotional avoidance. The three intervention conditions were scripted, administered by the first author, and were designed to be comparable in terms of (a) duration (15 min), (b) components included, such as rationale and realistic implementation, and (c) sequence of components.

Cognitive restructuring condition. The cognitive restructuring (CR) protocol used in this study was adopted from the study by Goldfarb (2009). This protocol was 15 minutes in length and based on *the Feeling Good Handbook* by David Burns (1999). The protocol began with a brief description of fear related to public speaking and clarified the nature of social anxiety (see Appendix F). Then it introduced a cognitive component to social anxiety, and taught

participants to critically evaluate their way of thinking by identifying cognitive distortions and replacing those thoughts with more adaptive ones. Participants were then instructed to engage in a cognitive restructuring exercise with the researcher. This exercise involved recording their thoughts related to the upcoming public speaking task and public speaking in general (i.e., “If I am nervous I won’t be able to do this”), identifying maladaptive thinking patterns about public speaking (i.e., “Personalization and blame”), and replacing these cognitions (Spencer, 2017). Conclusively, the participants were instructed to utilize the CR strategies that they had just learned for the upcoming public speaking task.

Acceptance-based condition. The acceptance-based protocol used in this study was also adopted from Goldfarb (2009), who based the protocol on the work of Block and Wulfert (2000) and Eifert and Forsyth (2005). The acceptance-based protocol provided directions for accepting distressing thoughts and emotions and proposed that controlling one’s thoughts and feelings may represent an unworkable agenda (see Appendix G). The acceptance-based protocol also introduced the participant to a metaphor (i.e., Quicksand metaphor; Hayes, 2005, p. 3-4). The metaphor emphasized the importance of accepting upsetting thoughts in accordance of one living life according to one’s values. Similar to the CR protocol, the acceptance-based protocol also featured a pragmatic cognitive defusion exercise that required participants to identify and label thoughts, emotions, and sensations and to accept these experiences in the context of the public-speaking task (Hayes et al., 2013; Spencer, 2017). Lastly, participants in the acceptance condition were instructed to use these strategies during the public speaking task.

Psychoeducational-based condition. The psychoeducational-based protocol was also adapted from Goldfarb (2009) study, which was based on the work of Barlow (2002) and Rathus & Greene (2008). The psychoeducational control-based protocol provided education on: 1) the

definitions of anxiety and fear and the differences between the two concepts (see Appendix 3), 2) the relationship between social anxiety and public speaking, 3) the DSM-V criteria for social phobia, 4) the prevalence of social phobia (Goldfarb, 2009), and 5) the different psychological and medicinal treatments for social phobia.

Public Speaking Task

Following the intervention, participants were given five-minutes to prepare for a five-minutes speech. The topic of the speech was autobiographical in nature and participants were asked to respond to five separate prompts. The prompts asked participants to describe one time when they dealt with adversity in addition to the strengths and weaknesses of their personality. Speeches were then videotaped for purposes of collecting public speaking performance data. Previous research has found that public speaking tasks that provide participants with freedom to select the topic of speech are ecological valid (Glassman et al., 2016; Spencer, 2017).

Use and Usefulness of Instructed Strategies

Following the speech, participants were also asked to rate their appointed intervention in terms of: 1) actual use of strategies described in the intervention during the public speaking task, and 2) perceived usefulness of the assigned intervention. Using a 4-point scale, ranging from 1 (*not at all*) to 4 (*Quite a bit*), participants rated how much the following statements applied to them: 1) “I used the assigned strategies during preparation for and delivery of my speech” (actual usage of appointed treatment strategy); 2) “I found this strategy to be very useful for preparation and delivery of my speech” (i.e., efficacy of strategy).

Results

Means and standard deviations of all outcome measures are included in Table 1. Descriptive and inferential statistics for the depended variables on all three experimental

conditions are provided in Table 2. A chi-square test of independence has shown that CBT, ACT and psychoeducational control groups did not significantly differ regarding ethnicity, $\chi^2(8)=9.41$, $p=.31$, gender, $\chi^2(2)=1.10$, $p=.58$, years in school, $\chi^2(6)=11.85$, $p=.07$, and anxiolytic use, $\chi^2(2)=.396$, $p=.82$. A one-way ANOVA found no statistically significant difference between the groups with regard to age, CBT ($M=20.38$, $SD=2.79$), ACT, ($M=18.77$, $SD=1.36$), and control, ($M=18.75$, $SD=.75$), $F(2,35)=3.25$, $p=.051$.

Hypothesis 1: Participants in ACT and CBT conditions will exhibit greater reduction in anxiety following the speech task in comparison to no treatment, control group. There were no pre-speech differences between the three conditions on the STAI-pre, CBT, ($M=50.00$, $SD=12.54$), ACT, ($M=42.69$, $SD=11.40$), and control, ($M=51.25$, $SD=10.33$) groups. A repeated measures ANOVA also confirmed that there was no significant difference between the groups, $F(2,35)=2.06$, $p=.142$. Although, participants in the Control condition reported greater levels of anxiety post-speech STAI-post ($M=53.33$, $SD=13.36$), in comparison to CBT condition ($M=49.08$, $SD=10.31$) and the ACT condition ($M=45.31$, $SD=10.81$). An ANOVA also found no statistically significant difference between conditions $F(2,35)=1.51$, $p=.234$.

Hypothesis 2: Participants receiving either ACT or CBT protocol will have greater public speaking performance than the control group. Although, participants in the CBT condition exhibited greater levels of speech performance ($M=22.08$, $SD=5.81$) than in the ACT condition ($M=22.23$, $SD=4.80$), or in the control condition ($M=24.33$, $SD=7.08$), an ANOVA did not find statistically significant difference between the conditions $F(2,35)=.556$, $p=.578$. In addition, there were no statistically significant between group differences in the PSP micro items ($M=13.18$, $SD=3.54$), $F(2,35)=.009$, $p=.991$, or in the PSP global items ($M=9.34$, $SD=3.02$), $F(2,35)=.313$, $p=.733$.

Hypothesis 3: Participants in ACT protocol will show less avoidance post intervention than participants in the CBT group, or participants in the control group. Participants in CBT and ACT conditions reported less avoidance post speech, CBT ($M=24.38$, $SD=7.87$), and ACT ($M=28.54$, $SD=6.29$), compared to their pre-speech scores, CBT ($M=26.08$, $SD=6.58$), and ACT ($M=29.23$, $SD=6.34$). However, the control group exhibited an increase in avoidance post-speech, control pre-speech ($M=25.41$, $SD=10.49$), and control post-speech ($M=26.58$, $SD=10.97$). Nonetheless, a repeated measures ANOVA did not show a statistically significant difference between conditions in AAQ-II pre and post measures $F(2,35)=.773$, $p=.470$. A visual representation for this interaction is depicted in Figure 2.

Hypothesis 4: Participants in the control condition will have higher subjective distress during and after the task compared to other two groups. An ANOVA found that all participants experienced significant differences in subjective distress ratings in measurement over time (pre, during, and post). A Mauchly's test indicated that the assumption of sphericity has not been met $\chi^2(2)=8.28$, $p=.02$. As a consequence, the degrees of freedom were adjusted using a Greenhouse-Geiser correction ($\epsilon=.818$), $F(1.64, 55.65)=17.97$, $p<.001$. Post hoc tests revealed participants' subjective distress at their peak moment of their speech ($M=75.09$, $SD=21.20$), being significantly higher, (all groups' $p<.05$) than the ratings given post speech ($M=58.54$, $SD=28.17$), or the rating given pre-speech ($M=43.35$, $SD=26.75$). There were no statistically significant differences between pre and post speech SUDS ratings ($p>.05$). Participants in the control condition exhibited higher subjective distress during the speech ($M=82.27$, $SD=20.26$), than participants in the CBT condition ($M=74.26$, $SD=21.70$), or participants in the ACT condition ($M=69.84$, $SD=21.38$), there were no statistically significant differences between the groups $F(2,34)=2.35$, $p=.11$, $\eta=.12$. A visual interaction for all conditions is depicted in Figure 3.

A exploratory analysis was done to examine if there was a statistical significant difference between SUDS ratings-during and treatment type. A t-test found no statistical significant difference between ACT or CBT, ($M=72.06$, $SD=21.22$), and control ($M=82.27$, $SD=20.26$), $t(35)=-1.36$, $p=.184$.

Hypothesis 5: Participants in the control condition will have higher physiological anxiety levels during and after the task compared to other two groups. An ANOVA found that all participants experienced significant differences in heart rate over time (pre, during, and post). A Mauchly's test indicated that the assumption of sphericity has not been met $\chi^2(2)=8.24$, $p=.02$. As a consequence, the degrees of freedom were adjusted using a Greenhouse-Geiser correction ($\epsilon=.823$), $F(1.65, 57.61)=16.26$, $p<.001$. Post hoc tests revealed participants' heart rate at the highest point of their speech ($M=105.57$, $SD=13.46$), being significantly higher, (all groups' $p<.001$) than the ratings given post speech ($M=90.18$, $SD=18.06$), or the rating given pre-speech ($M=105.50$, $SD=16.31$). There were no statistically significant difference between pre and post speech BPM ratings ($p>.05$). Although participants in the control condition exhibited higher physiological anxiety during their speech ($M=109.83$, $SD=10.83$), than participants in the ACT condition ($M=106.38$, $SD=13.88$), or participants in the CBT condition ($M=100.84$, $SD=14.68$), there were also no statistically significant difference between the groups $F(2,35)=.02$, $p=.98$, $\eta=.00$. A visual interaction for all conditions in heart rate is depicted in Figure 4. A exploratory analysis was done to examine if there was a statistical significant difference between bpm rates-during the speech and treatment type. A t-test found no statistical significant difference between ACT or CBT, ($M=103.61$, $SD=14.28$), and control ($M=109.83$, $SD=10.83$), $t(36)=-1.34$, $p=.189$.

Participant Usage of Interventions: Fifty-three percent of participants reported they used the intervention during the preparation for their speech "somewhat". In addition, 42% of

the participants found the intervention “somewhat” useful. A chi-square goodness of fit showed that participants’ rating for usage of the intervention $\chi^2(6)=6.53, p=.37$, and usefulness of the intervention $\chi^2(6)=12.02, p=.06$, did not significantly differ from what would be expected by chance. Table.. depicts detailed descriptions of participants ratings of the interventions.

Participant Ratings of Public Speaking Task: Following the speech, participants provided information for the public speaking task and 58% of them reported experiencing live audience of two confederates during the speech “moderately distressing”. In addition, 34% of the participants reported experiencing the presence of confederates during their speech “extremely distressing”. Moreover, 79% of the participants reported that the confederates’ non-comital behavior during the speech caused “increased anxiety”. A chi-square goodness of fit showed that participants’ rating of distress caused by confederates, $\chi^2(4)=12.86, p<.05$, and the confederates’ non-comital behavior during intervention $\chi^2(4)=1.14, p=.89$, significantly differed from what would be expected by chance. Table.. depicts detailed descriptions of participants ratings of the public speaking task.

Discussion

The purpose of the present study was to investigate whether acceptance, cognitive reappraisal, or psychoeducational-based brief interventions were more effective for increasing public speaking performance among anxious individuals. The main finding was that there were no statistically significant differences between conditions regarding reductions in anxiety and public speaking performance. Results indicated that participants who received either an acceptance-based, or a cognitive-based protocol, showed less distress during the public speaking task compared to those who received the psychoeducational-control protocol. In addition, most of the participants rated the public speaking task as considerably distressing, providing support

for the external validity of the public speaking task. Most of the participants also found these interventions “somewhat” useful.

There were no statistically significant differences between groups in avoidance post intervention, although participants who received the cognitive-reappraisal protocol exhibited less avoidance post intervention and participants who received the psychoeducational-control protocol showed an increase in avoidance post speech. This finding is inconsistent with previous research, which found that decreases in avoidance mediated the relationship between ACT and decreases in distressing symptoms (Hayes et al., 2006; Spencer, 2017). It is important to note, however, that this study was not indented as a mediation analysis.

As expected, participant ratings of distress (as measured by SUDS ratings) during the speech were significantly higher than ratings before, or after the speech. These findings indicate that the public speaking task induced subjective distress in participants, providing some evidence for the external validity of the public speaking task. Moreover, participants who received the acceptance-based protocol reported lower levels of subjective distress during the public speaking task than participants in the other two conditions, although the difference among interventions was not statistically significant. This finding was consistent of what one would expect from a self-reported measure and also consistent with previous research, which found that ACT works through teaching acceptance of distressing private events, rather than decreasing the content of or the distress associated with unpleasant private experiences (Hayes et al., 2013; Spencer, 2017). Overall, findings provide some preliminary evidence that the acceptance-based intervention may help participants in managing their distress during public speaking because acceptance may be associated with greater cognitive resources available for other tasks, such as giving a speech

(Hayes et al., 2013). In addition, the time given to participants for speech preparation was very short, which may have artificially increased the amount of stress and physiological activity in response to the speech.

Findings from previous research has indicated that participants in all three conditions exhibited increases in heart rate during the speech (Goldfarb, 2009). In the current study, heart rate data indicated greater anxiety during the speech compared to before or after the speech for participants in the acceptance-based and psychoeducational-control protocols. Those in the cognitive-reappraisal protocol, conversely, showed decreases in anxiety during and after the speech compared to before the speech. This finding might have occurred because cognitive restructuring promoted controlling and changing maladaptive thoughts instead of accepting them. These between-group differences with regard to heart rate data were not statistically significant, however

Limitations and Future Directions

Some limitations of this study were related to the interventions used. For example, the current study utilized very brief interventions (15 minutes in length). Most of the protocols utilized in the existing literature, however, are longer and therefore may have greater benefits (i.e. 60-90 minutes; Glassman et al., 2016; Gutierrez, Luciano, Rodriguez, & Fink, 2004). In addition, data from this study suggests that the brief nature of the intervention may have reduced the intended impact on participants. For example, only 26.3% of the participants reported using the intervention “a little bit” while 16% of participants used the intervention “quite a bit” when preparing for their speech. As expected, due to the nature of the study participants were not overtly pursuing an intervention to improve public speaking performance, rather they were

searching for extra credit for their course; thus, their degree of motivation to make use of the intervention can be questioned. In addition, the study did not ask participants to report if they had taken a public speaking class, or if they had experience with public speaking. Overall, the brief nature of the interventions and possible lack of participant motivation might account for the absence of significant effects regarding public speaking performance and anxiety. Therefore, future research may wish to include longer treatment protocols and focus on recruiting a sample of socially-anxious individuals who are motivated improve their public speaking performance.

Some limitations of the study were related to the sample. First, the sample included in this study was relatively small. One implication of the small sample size is that statistical power was limited, making it difficult to detect small effect sizes even if they existed. A small sample size affected the power, therefore, future research should also increase the sample size. Second, although the current study increased the inclusion criteria to include individuals with more severe public speaking anxiety, the sample exhibited a wide range of severity of public speaking anxiety as measured by the SPS. Some of the individuals reported very little anxiety while other participants exhibited intense anxiety and distress such that they were unable to complete the study. This wide variability in pre-existing social anxiety indicates that the sample was quite heterogeneous, making it more difficult to detect treatment differences. Furthermore, the sample was not representative of clinical populations of individuals with social anxiety. Third, the sample consisted of mostly Caucasian, female college students between the ages of 18-24, which limits the generalizability of the findings to the larger population of those with public speaking anxiety. Implications for future research include obtaining a larger, more diverse sample of individuals that more closely represent individuals with clinical levels of social anxiety (e.g., those with a DSM-V diagnosis of social anxiety disorder). In addition, future research may

would want to explore comparisons between individuals with low anxiety and individuals with high anxiety. This could be done by evenly splitting the sample according to SPS scores and then running comparisons between these two groups to determine if there are any differences in the effectiveness of treatment.

Additional limitations concerned some of the outcome measures. For example, the lack of statistically significant results concerning heart rate might reflect problems with this physiological measure. Very often, multiple variables can affect heart rate, such as participants' body temperature and previous physical exercise. Previous research has expressed the concern that the particular heart monitor was inaccurate or an incomplete measure of physiological distress (Goldfarb, 2009). Another limitation concerns measurement of heart rate. More robust findings may have emerged if true baseline data (i.e., resting heart rate data collected under normal conditions) had been collected. Unfortunately, in the current study heart rate data was collected immediately after the participant signed the consent form and learned about the stressful nature of the study. Therefore, the pre-speech heart rate data may have been much higher than participant's normal resting heart rate. In addition, younger participants might have less ability to regulate heart rate.

Other limitations of this study concern the measurement of speech performance. The intrinsic subjectivity involved in rating speech performance may have influenced the results. Although, the current study emphasized extensive training of raters, the measures of IOA were at 41%. Previous research has found that some variance among raters of public speaking performance is acceptable (Orr, 2008). Future research should implement more rigorous

observer training and require raters to achieve a specified IOA before proceeding with scoring (Spencer, 2017).

An added limitation is the absence of significant findings with regard to public speaking performance. Although no significant differences were found, participants who received the acceptance-based protocol actually displayed *higher* levels of speech performance, while the psychoeducational-control protocol exhibited the lowest levels of speech performance. Although, the finding was consistent with the study's hypothesis, the lack of significant findings was not consistent with previous research (Glassman et al., 2016). The current findings were also similar to Spencer (2017) study, which found no significant difference between the groups.

The public speaking task used in this study was somewhat novel compared to other studies and was designed to reflect the nature of commonly encountered social settings such as a job interview. The task appeared to have ecological validity based on data suggesting that the task was stressful for many participants. In addition, the format of the public speaking task (i.e. limited preparation time, the spontaneous nature of the task, talking about oneself, and the presence of confederates) was consistent with previous research (Morison et al., 2016; Spencer, 2017). However, the fact that the public speaking task has not been validated in previous research can also be potentially viewed as a limitation when more well-established public speaking tasks are described in the research literature (Westenberg et al., 2009; Spencer, 2017).

In addition, the heart rate data included three outliers, defined as any data point that was two standard deviations above or below the mean. The three outliers in heart rate data included two outliers above the mean and one below the mean in pre-speech heart rate. This is a limitation

of the study because outliers skew the data away from the means toward that outlier, which may not represent the true mean of this sample.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Beck, A. T., & Dozois, D. J. (2011). Cognitive therapy: Current status and future directions. *Annual Review of Medicine*, 62, 397-409. Doi: 10.1146/annurev-med-052209-100032.
- Bond, F. W., Hayes, S. C., Baer, R. A., Carpenter, K. M., Guenole, N., Orcutt, H. K., Waltz, T., & Zettle, R. D. (2011). Preliminary psychometric properties of the Acceptance and Action Questionnaire – II: A revised measure of psychological inflexibility and experiential avoidance. *Behavior Therapy*, 42, 676-688.
- Block, J. A. (2003). *Acceptance or change of private experiences: A comparative analysis in college students with public speaking anxiety* (Doctoral dissertation). Retrieved from Proquest Information and Learning Company (3063960).
- Block, J. A., & Wulfert, E. (2000). Acceptance or change: Treating socially anxious college students with ACT or CBGT. *The Behavior Analyst Today*, 2, 3-10.
<http://dx.doi.org/10.1037/h0099879>
- Craske, M. G., Niles, A. N., Burklund, L. J., Plumb-Villardaga, J. C., Saxby, D. E., Wolitzky-Taylor, K. B., ...& Arch, J. J. (2014). Randomized controlled trial of cognitive behavioral therapy and acceptance and commitment therapy for social phobia: Outcomes and moderators. *Journal of Counseling and Clinical Psychology*, 82, 6, 1034-1048.
<http://dx.doi.org/10.1037/a0037212>
- Cunningham, V., Lefkoe, M. & Sechrest, L. (2006). Eliminating fears: An intervention that permanently eliminates the fear of public speaking. *Clinical Psychology & Psychotherapy*, 13, 183–193. DOI: 10.1002/cpp.487

Dalrymple, K. L., & Herbert, J. D. (2007). Acceptance and commitment therapy for generalized social anxiety disorder. *Behavior Modification, 31*, 543–568.

<http://dx.doi.org/10.1177/0145445507302037>

England, E. L., Herbert, J. D., Forman, E. M., Rabin, S. J., Juarascio, A., & Goldstein, S. P. (2012). Acceptance-based exposure therapy for public speaking anxiety. *Journal of Contextual Behavioral Science, 1*, 66-72.

Forman, E. M., Herbert, J. D., Moitra, E., Yeomans, P. D., & Geller, P. A. (2007). A randomized controlled effectiveness trial of acceptance and commitment therapy and cognitive therapy for anxiety and depression. *Behavior Modification, 31*, 772-799.

Forman, E. M., & Herbert, J. D. (2009). New directions in cognitive behavior therapy: Acceptance-based therapies. In W. T. O'Donohue & J. E. Fisher (Eds.), *General principles and empirically supported techniques of cognitive behavior therapy* (pp. 77-101). Hoboken, NJ, US: John Wiley & Sons Inc.

Gardner, F. L., & Moore, Z. E., (2004). A mindfulness-acceptance-commitment-based approach to athletic performance enhancement: Theoretical considerations. *Behavioral Therapy, 35*, 707-723.

Glassman, L. H., Forman, E. M., Herbert, J. D., Bradley, L. E., Foster, E. E., Izzetoglu, M., & Ruocco, A. C. (2016). The effects of a brief acceptance-based behavioral treatment versus traditional cognitive-behavioral treatment for public speaking anxiety: An exploratory trial examining differential effects on performance and neurophysiology. *Behavioral Modification, 40:5*, 748-776. DOI: 10.1177/0145445516629939

- Goldfarb, J. A. (2009). *Effects of acceptance versus cognitive restructuring on public speaking anxiety in college students* (Doctoral Dissertation). Retrieved from: ProQuest, LLC (3367271).
- Gould, R. A., Buckminster, S., Pollack, M. H., Otto, M. W., & Yap, L. (1997). Cognitive-behavioral and pharmacological treatment for social phobia: A meta-analysis. *Clinical Psychology Science and Practice*, 4, 291–306. DOI:10.1111/j.1468-2850.1997.tb00123.x
- Gutierrez, O., Luciano, C., Rodriguez, M., & Fink, B. C. (2004). Comparison between an acceptance-based and a cognitive-control-based protocol for coping with pain. *Behavior Therapy*, 35, 767-783. DOI: 10.1016/S0005-7894(04)80019-4
- Hayes, S. C., (2008). Climbing our hills: A beginning conversation on the comparison on the acceptance and commitment therapy and cognitive behavioral therapy. *Clinical Psychology: Science and Practice*, 15(4), 286-295.
- Hayes, S. C., (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behavioral Therapy*, 35, 639-665.
- Hayes, S. C., Bissett, R. T., Korn, Z., Zettle, R. D., Rosenfarb, I. S., Cooper, L. D., & Grundt, A. M. (1999). The impact of acceptance versus control rationales on pain tolerance. *The Psychological Record*, 49, 33-47.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behavior change*. New York: Guilford Press.
- Herbert, J. D., & Cardaciotto, L. (2005) A mindfulness and acceptance based perspective on social anxiety disorder. In S.M. Orsillo & L. Roemer (Eds.), *Acceptance and*

- mindfulness-based approaches to anxiety: Conceptualization and treatment* (pp. 189-212). New York: Springer.
- Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*, 617-627.
- Hoffman, G. S., (2007). Cognitive factors that maintain social anxiety disorder: A comprehensive model and its treatment implications. *Cognitive Behavior Therapy*. *36*(4), 193–209.
- Leibowitz, M. R. (1987). Social Phobia. *Modern Problems in Pharmacopsychiatry*, *22*, 141- 173.
- Little, L. M. & Simpson, T. L. (2000). An acceptance-based performance enhancement intervention for college athletes. In M.J. Dougher (Ed.), *Clinical Behavior Analysis* (231-244). Reno Nevada: Context Press.
- Loerinc, A. G., Meuret, A. E., Twohig, M. P., Rosenfield, D., Bluett, E. J., & Craske, M. G. (2015). Response rates for CBT for anxiety disorders: Need for standardized criteria. *Clinical Psychology Review*, *42*, 72-82. doi: 10.1016/j.cpr.2015.08.004
- Mattick, R. P., & Clarke, J. C. (1998). Development and validation of measures of social phobia scrutiny fear and social interaction anxiety. *Behaviour Research and Therapy*, *36*, 455-470.
- Morrison, A. S., Brozovich, F. A., Lee, I. A., Jazaieri, H., Goldin, P. R., Heimberg, R. G., & Gross, J. J. (2016). Anxiety trajectories in response to a speech task in social anxiety disorder: Evidence from a randomized controlled trial of CBT. *Journal of Anxiety Disorders*, *38*, 21-30. <http://dx.doi.org/10.1016/j.janxdis.2015.12.006>
- Rapee, R. M., & Heimberg, R. G. (1997). A cognitive-behavioral model of anxiety in social phobia. *Behavior Research and Therapy*, *35*, 741-756.

- Rapee, R. M., & Lim, L. (1992). Discrepancy between self-and observer ratings of performance in social phobics. *Journal of Abnormal Psychology, 101*:4, 728-731.
- Ruiz, F. J. (2012). Acceptance and commitment therapy versus traditional cognitive behavioral therapy: A systematic review and meta-analysis of current empirical evidence. *International Journal of Psychology & Psychological Therapy, 12*, 333-357.
- Ruscio, A. M., Brown, T. A., Chiu, T. A., Sareen, J., Stein, M. B., & Kessler, R. C. (2008). Social fears and social phobia in the United States: Results from the national comorbidity survey replication. *Psychological Medicine, 38, 1*, 15-28.
- Tanner, B. A. (2011). Validity of global physical and emotional SUDS. *Applied Psychophysiological Biofeedback, 37*, 31-34. DOI 10.1007/s10484-011-9174-x
- Spielberger, C. D. (1983). *State-Trait Anxiety Inventory Manual (Form Y)*. Palo Alto, California: Mind Garden, Inc.
- Spielberger, C. D., & Vagg, P. R. (1984). Psychometric properties of the STAI, a reply to Ramanaiah, Franzen, and Schill. *Journal of Personality Assessment, 48*, 95-97.
- Spencer, S. D., (2017). *Comparing brief acceptance and control-based interventions: Evaluating public speaking performance in socially-anxious individuals*. (Unpublished master's thesis). Minnesota State University, Mankato, Minnesota.
- Orr, E. M. (2008). *Therapeutic Benefits of an Enhanced Video Feedback Intervention for Socially Anxious Individuals* (Master's thesis). Retrieved from: Proquest, LLC.
- Westenberg, P. M., Bokhorst, C. L., Miers, A. C., Sumter, S. R., Kallen, V. L., van Pelt, J., Blote, A. W. (2009). A prepared speech in front of a pre-recorded audience: Subjective, physiological, and neuroendocrine responses to the Leiden Public Speaking Task. *Biological Psychology, 82*, 116-124. doi:10.1016/j.biopsycho.2009.06.005

Zettle, R. D., (2003). Acceptance and commitment therapy (ACT) vs. systematic desensitization in treatment of mathematics anxiety. *The Psychological Record*, 53, 197-215.

Table 1.

Overall Means for Dependent Variables

Measure	<i>M</i>	<i>SD</i>
AAQ-II-pre	29.23	6.34
AAQ-II-post	28.53	6.29
AAQ-II-total	26.50	8.47
STAI-pre	42.69	11.40
STAI-post	45.31	10.81
STAI-total	49.13	11.68
SUDS-pre	34.08	24.58
SUDS-during	69.84	21.38
SUDS-post	50.15	24.65
BPM-pre	102.76	21.48
BPM-during	106.38	13.88
BPM-post	93.61	14.34
PSP-total	22.84	5.86

Note. $N=38$ for all measures

Table 2.

Means for Dependent Variables by Condition

Measure	Pre-speech	During-speech	Post-speech	Test Statistic	Sig. Level
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>F</i>	<i>p</i>
AAQ-II				.77	.47
CBT	26.07(6.58)	N/A	24.38(7.87)		
ACT	29.23(6.34)	N/A	28.54(6.29)		
Control	25.42(10.49)	N/A	26.58(10.97)		
STAI				1.51	.23
CBT	50.00(12.54)	N/A	49.08(10.32)		
ACT	42.69(11.40)	N/A	45.31(10.81)		
Control	51.25(10.33)	N/A	53.33(13.36)		
SUDS				17.97	.001
CBT	51.92(27.12)	74.26(21.70)	56.98(27.69)		
ACT	34.08(24.58)	69.85(21.38)	50.15(24.65)		
Control	44.18(27.55)	82.27(20.26)	71.36(30.45)		
BPM				16.26	.001
CBT	107.61(10.75)	100.84(14.68)	91.92(10.34)		
ACT	102.76(21.48)	106.38(13.88)	93.62(14.34)		
Control	106.17(15.82)	109.83(10.83)	84.58(26.55)		
PSP				.56	.58
CBT		22.08(5.81)			
ACT		22.23(4.80)			
Control		24.33(7.08)			

Note. $N=13$ for CBT and ACT groups and $N=12$ for Control group. Test statistic compared all participants from pre-post speech measurements, except PSP, which compared CBT, ACT, and Control group scores.

Table 3.

Participant Ratings of Interventions

Question	Not at all	A little bit	Somewhat	Quite a bit
Use	5.3%	26.3%	52.6%	15.8%
Utility	10.5%	18.4%	42.1%	28.9%

Note. $N=38$ for all ratings.

Table 4.

Participant Ratings of Public Speaking Task

Not at all distressing	Slightly distressing	Moderately distressing	Extremely distressing
0%	7.9%	57.9%	34.2%

Note. $N=38$ for all ratings.

Figure 1.

Experimental Flow Chart

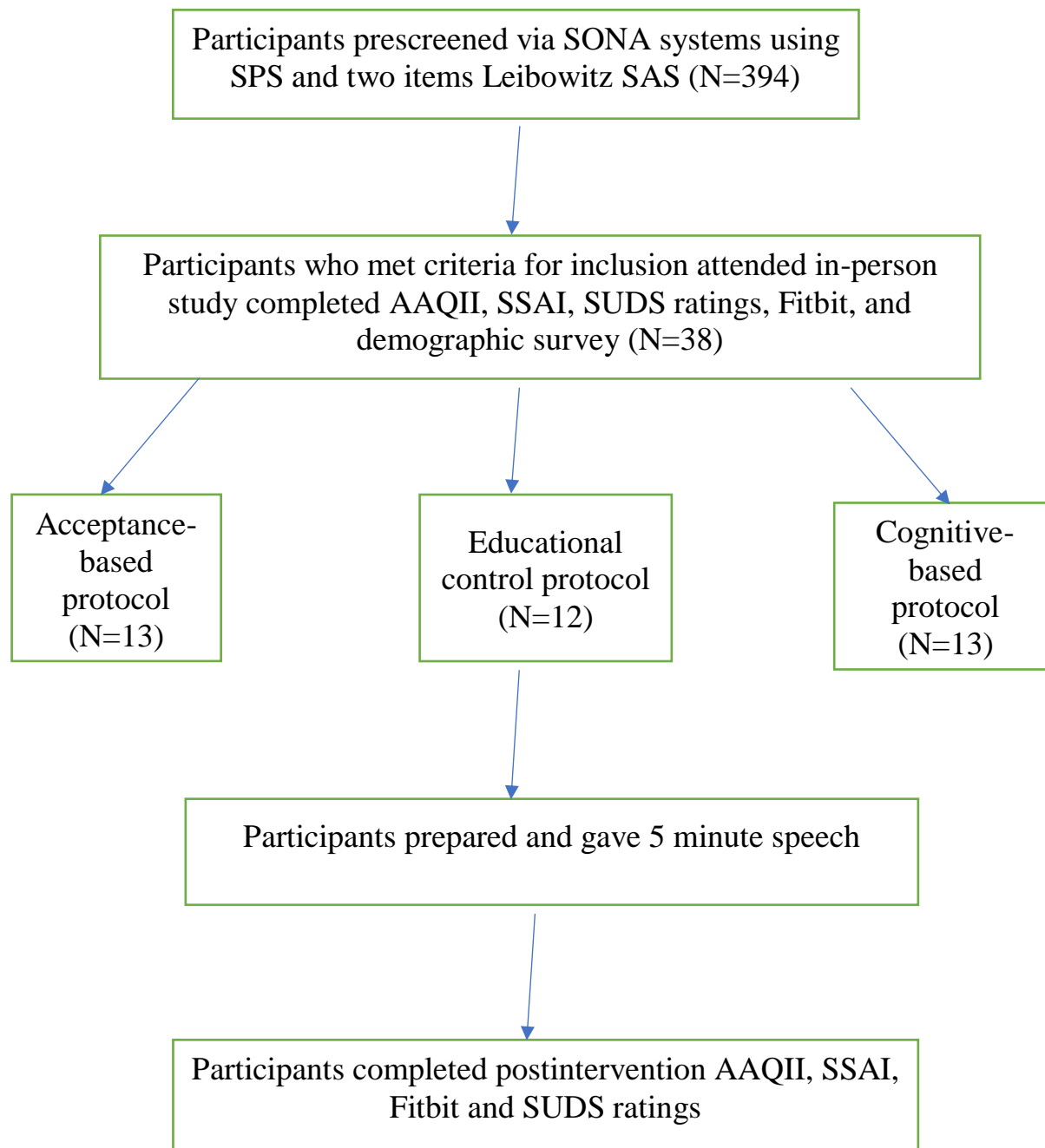


Figure 2.

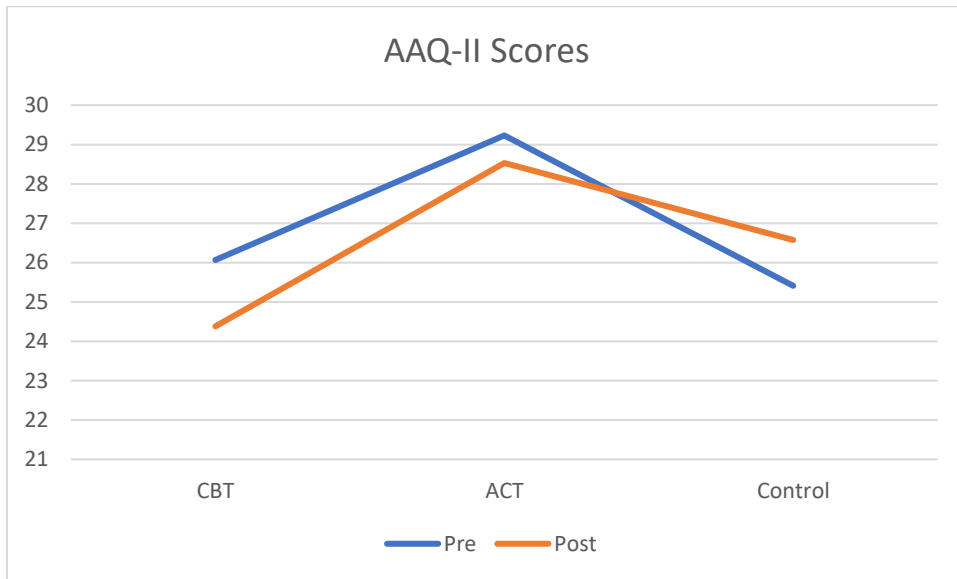
Interaction Between Intervention Conditions and AAQ Scores

Figure 3.

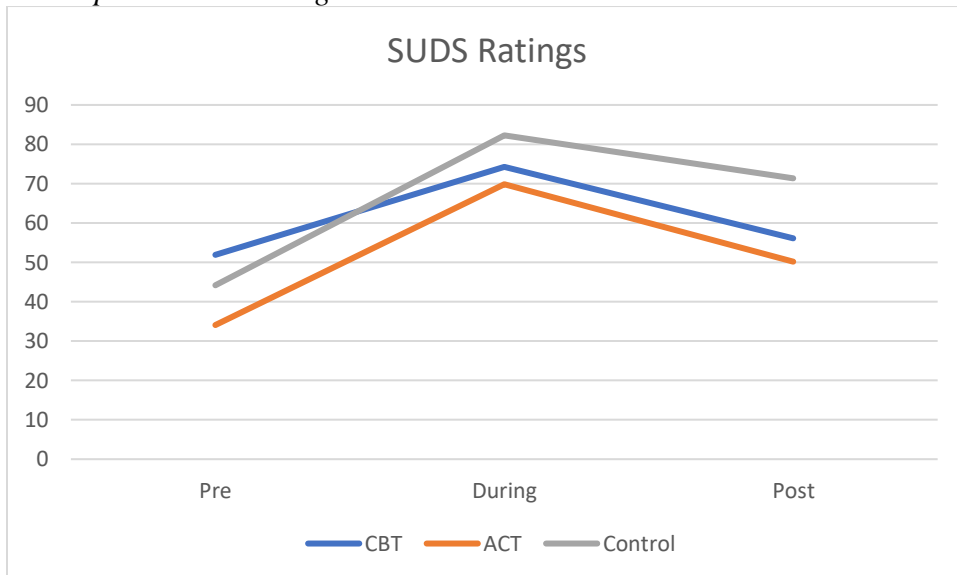
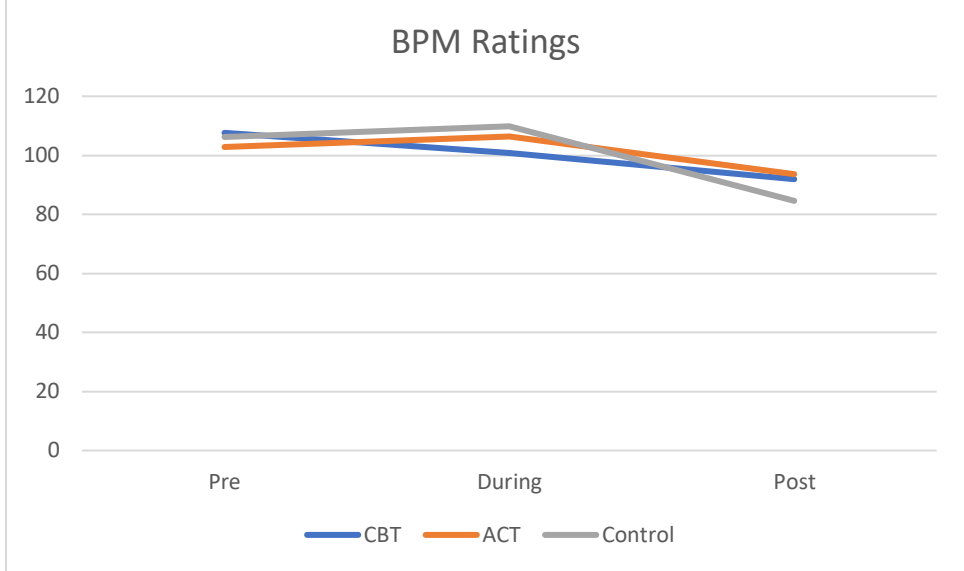
Participant SUDS Ratings Across Measurement In Time

Figure 4.

Participant BPM Ratings Across Measurement In Time



Appendix A

Recruitment Email sent to eligible participants

You are receiving this email because you recently participated in the online study “Evaluating interventions for public speaking anxiety in college students,” and indicated that you were interested in participating in the in-person part of this study. Participation in the in-person study would take about ***45 minutes*** and earn you ***8 SONA extra credit points***.

The next step in the process, if you’re interested, would be for us to arrange a time when you could come in to my lab and I would explain the experiment in depth and allow you an opportunity to have any questions you may have answered before proceeding. I have listed some dates/times below which I have availability. Feel free to select from any of these times. If none of these times work, let me know and we can find a more agreeable time.

Applicable date/times listed here

Thanks again for taking the time to help out by participating in my research. Also, just an FYI, the study will take place in my lab in Armstrong Hall (AH) 31. I would be more than happy to give you directions if you don't know where we are.

Hope to hear from you soon,

Appendix B

Participant ID #: _____

Demographic Information

Age: _____

Gender:

Male: _____ Female: _____

Educational Level:

Freshman: _____

Sophomore: _____

Junior: _____

Senior: _____

Other: _____

Ethnicity

White/Caucasian: _____

Black/African-American: _____

Latin-American: _____

Asian-American: _____

Other: _____

Subjective Units of Discomfort

On a scale of 0-100, with 0 representing *no distress* and 100 representing *the most conceivable distress*, please rate your discomfort at this moment.

Appendix C
STAI Form

Self-Evaluation Questionnaire STAI Form
Y-1

VERY MUCH SO
MODERATELY SO
SOMEWHAT
NOT AT ALL

DIRECTIONS:

A number of statements which people have used to describe themselves are given below. Read each statement and then circle

- | | | | | |
|--|---|---|---|---|
| 1. I feel calm | 1 | 2 | 3 | 4 |
| 2. I feel secure | 1 | 2 | 3 | 4 |
| 3. I am tense | 1 | 2 | 3 | 4 |
| 4. I feel strained | 2 | 3 | 4 | |
| 5. I feel at ease | 2 | 3 | 4 | |
| 6. I feel upset | 1 | 2 | 3 | 4 |
| 7. I am presently worrying over possible misfortunes | 1 | 2 | 3 | 4 |
| 8. I feel satisfied | 1 | 2 | 3 | 4 |
| 9. I feel frightened | 1 | 2 | 3 | 4 |
| 10. I feel comfortable | 1 | 2 | 3 | 4 |
| 11. I feel self-confident | 1 | 2 | 3 | 4 |
| 12. I feel nervous | 1 | 2 | 3 | 4 |
| 13. I am jittery | 1 | 2 | 3 | 4 |
| 14. I feel indecisive | 1 | 2 | 3 | 4 |
| 15. I am relaxed | 2 | 3 | 4 | |
| 16. I feel content | 1 | 2 | 3 | 4 |
| 17. I am worried | 1 | 2 | 3 | 4 |
| 18. I feel confused | 1 | 2 | 3 | 4 |
| 19. I feel steady | 1 | 2 | 3 | 4 |
| 20. I feel pleasant | 1 | 2 | 3 | 4 |

Appendix D

AAQ-II

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1	2	3	4	5	6	7
never true	very seldom true	seldom true	sometimes true	frequently true	almost always true	always true

1. My painful experiences and memories make it difficult for me to live a life that I would value. 1 2 3 4 5 6 7
2. I'm afraid of my feelings. 1 2 3 4 5 6 7
3. I worry about not being able to control my worries and feelings. 1 2 3 4 5 6 7
4. My painful memories prevent me from having a fulfilling life. 1 2 3 4 5 6 7
5. Emotions cause problems in my life. 1 2 3 4 5 6 7
6. It seems like most people are handling their lives better than I am. 1 2 3 4 5 6 7
7. Worries get in the way of my success. 1 2 3 4 5 6 7

Appendix E

**PSP
(Rapee & Lim, 1992)**

We would like you to rate yourself on the features listed below. For each feature, please circle the appropriate number to indicate how you felt you actually performed. Your evaluation will remain confidential. For questions regarding the “audience,” include anyone who was interacting with you, observing you, or listening to you during the exposure

0 = Not at all
1 = Slightly
2 = Moderately
3 = Much
4 = Very much

1. Content was understandable.
2. Kept eye contact with audience.
3. Stuttered.
4. Had long pauses (more than 5 seconds).
5. Fidgeted.
6. “Um’ed” and “Ah’ed” alot
7. Had a clear voice.
8. Seemed to tremble or shake.
9. Sweated.
10. Blushed.
11. Face twitched.
12. Voice quivered.
13. Appeared confident.
14. Appeared nervous.
15. Kept audience interested.
16. Generally spoke well.
17. Made a good impression.

Appendix F

Cognitive Restructuring Protocol

.(Partially Adapted from Block (2003) and Bums (1999))

I. Introduction (1 minute)

- Fear of Public Speaking is one of the most common fears in the United States.

Most people try as best as possible to avoid this. One study indicates that approximately 85% of people in the United States report some discomfort related to public speaking.

- Therapists do not have a magic wand and anxiety cannot be eliminated in one session.

However, if you stick with it and incorporate lessons, you can learn to manage the anxiety so that it is no longer a problem in your life.

II. Rationale for Cognitive Approach: (3-4 minutes)

- Definition of fear (adaptive response to a threatening situation) versus anxiety (future-oriented; response to a situation that is not objectively dangerous)

- Cognitive Component of Anxiety: How you think about a situation will influence your emotional response, which will influence your behavioral response. The goal of this technique is to help you understand that the ways that you think about a situation might not be adaptive, and give you tools to help you think in ways that are adaptive. (i.e. We need to change the negative thinking.)

III. Cognitive Restructuring: (5-6 minutes)

- Think for a moment about your upcoming speech. Write down any negative thoughts you might have just before you give your talk today. (Hand the participant a worksheet

titled "negative thoughts" - see below)

- Hand the participant a "checklist of cognitive distortions" (see below) and explain the idea of a cognitive distortion.
- Go over a sample thought: "If I'm nervous; I won't be able to present my ideas very clearly" Explain how that relates to both "all or nothing thinking" and "fortune-telling"
- Ask participant to review the thoughts he/she put down on the sheet and to identify which cognitive distortions they related to and to provide some suggested rational alternatives. Suggestions and encouragement will be provided in formulating the rational alternatives. This sheet and the checklist will be saved in order to be utilized in a later part of the session.

IV. Part Two: Independent strategy review just prior to the speech (15 minutes)

- Instruct the participant to review their thoughts and related cognitive distortions as well as focusing on the rational alternatives provided. In addition, if they have any additional negative thoughts they should be written down on the sheet and compared to the list of cognitive distortions independently.

Negative Thoughts

1			
2			
3			
4			
5			

Checklist of Cognitive Distortions

(Adapted from Burns, 1999)

1. **All-or-nothing thinking:** You look at things in absolute, black-and-white categories.
2. **Overgeneralization:** You view a negative event as a never ending pattern of defeat.
3. **Mental filter:** You dwell on the negatives and ignore the positives.
4. **Discounting the positives:** You insist that your accomplishments or positive qualities "don't count."
5. **Jumping to conclusions:** (A) Mind reading- you assume that people are reacting negatively to you when there's no definite evidence for this; (B) Fortune-telling- you arbitrarily predict that things will turn out badly.
6. **Magnification or minimization:** You blow things way out of proportion or you shrink their importance inappropriately.
7. **Emotional reasoning:** You reason from how you feel: "I *feel* like an idiot, so I really must be one." Or "I don't *feel/like* doing this, so I'll put it off."
8. **"Should statements":** You criticize yourself or other people with "shoulds" or "shouldn'ts." "Musts," "oughts," and "have tos" are similar offenders.
9. **Labeling:** You identify with your shortcomings. Instead of saying "I made a mistake," you tell yourself, "I'm a jerk," or "a fool," or "a loser."
10. **Personalization and blame:** You blame yourself for something you weren't entirely responsible for, or blame other people and overlook ways that your own attitudes and behaviors might contribute to a problem.

Appendix G

Acceptance Protocol

(Partially Adapted from Block (2003) and Eifert & Forsyth (2005))

I. Introduction (1 minute)

* Read: All Questions will be answered after the presentation is completed.

- Fear of Public Speaking is one of the most common fears in the United States.

Most people try as best as possible to avoid this. One study indicates that approximately 85% of people in the United States report some discomfort related to public speaking.

- Therapists do not have a magic wand and anxiety cannot be eliminated in one session.

However, if you stick with it and incorporate this lesson in your life, you can learn to manage the anxiety so that it is no longer a problem.

II. Rationale for Acceptance Approach: (3-4 minutes)

- It is apparent that most of us try very hard to control our emotional experiences; we link thoughts and feelings to goals and outcomes. However, maybe it is not that we have not figured it out, but that in a real sense, they cannot be consciously controlled (for example, sometimes we cannot prevent our hands from shaking, or voice from trembling; and in the same way we cannot make anxious thoughts go away). Maybe we are dealing with an unworkable agenda. Maybe we are trying to do something that cannot be done

- Now I am going to tell you a metaphor that I would like you to relate to your thoughts and feelings. It is called the Quicksand Metaphor (handout copy of metaphor- see below). *Read this aloud slowly to the participant.*

- Anxiety is what it is, in many instances a perfectly adaptive response and in other instances

a nuisance -----either way, it is a part of being a fully functioning human being

- Anxiety is part of living rather than a cause of not living
- To live a valued life, one must be willing to take the totality of human experience along for the ride.
- In sum, mary, it is very important to behave in the way that you want to behave even with the anxiety you might feel. It is important to focus on what you want to do and not what you want to feel.

III. ACT-style Exposure: (5-6 minutes)

- Before you begin speaking, I would like us to practice together putting the above principles to work. I would like you to close your eyes for a moment and think about the upcoming speech (pause this script for 5 seconds). Notice your thoughts (brief pause). ... Notice your feelings (brief pause).....and notice any bodily sensation (10 second pause). Notice how you can experience all of these thoughts, feelings, and sensations without needing to change anything about them. In a moment, I will ask you to describe out loud whatever you are experiencing. I am going to ask that you label each experience what it is (e.g.'s: " I am having the thought that people will think I am stupid";, "I am having the sensation that my heart is racing"). Now you tell me what you are

experiencing. *(individual describes experience out loud. Jot down comments in the lines below)*

(Now reflect these ideas back to them, and switch to using the proper language in identifying the experience they described)

We think that this type of talk can be helpful, as people tend to get very caught up in their experience.

Labeling thoughts, feelings, and bodily sensations as thoughts feelings and bodily sensations may allow us to gain a little distance from these experiences. Labeling thoughts, feelings and bodily sensations as what they really are as opposed to what they say they are may allow you to accomplish the desired behavior.

For example, when we label our bodily sensations as anxiety, we may be more likely to avoid it than if we label it as my heart is racing fast, I am breathing quickly, those are the actual experiences.

_(person's name) is it ok that you are having these thoughts, feelings,

sensations, that you can notice them and just let them be? (STOP and wait for the answer) Are you willing to try and go forward with this speech while

accepting these experiences? (Pause and wait for the answer)

Quicksand metaphor

We have a problem here, and that is that our minds tell us to do what doesn't work, because it doesn't see anything else to do. It is like as if you were stuck in quicksand. Naturally, you would try to get out. But, everything that you have learned about how to get out causes problems in quicksand. If you try to walk, jump, run, you just end up pushing down on the sand. If you struggle, crawl, or push with your hands, you just sink deeper. Often as people sink in quicksand, they get panicky and start flailing around, and down they go.

In quicksand, the only thing to do is to create as much surface area as possible, to lay out on the quicksand, getting everything that you have in full contact with it. Our relationship with our thoughts and feelings is like that. We need to get everything that we have in full contact with what we have been struggling with, but without more struggle. This may be hard. Not hard meaning effortful, but hard meaning tricky. It is tricky because our minds tell us to do what doesn't work because we can't see anything else to do. And we have learned this so well that we can't just tell ourselves to stop and expect that we will. So what I am telling you is to make as much contact with your anxiety as you can in a public speaking situation. **Do not try to decrease anxiety in any way.**

Appendix H
Educational Control Protocol

(Partially adapted from Barlow (2002) and Nevid, Rathus & Greene, (2008))

I) Introduction (5minutes)

A) Definition of Anxiety

- 1) How would you define anxiety? *Ask the participant if they have any ideas on this*
- 2) An example of a psychological definition: "An emotional state characterized by physiological arousal, unpleasant feelings of tension and a sense of apprehension or foreboding" (Nevid, Rathus & Greene, 2008)

B) Social Phobia; vs. Fear

- 1) What is the difference? *(Ask the participant if they have any ideas on this)*
- 2) A phobia is generally explained to be an excessive or irrational fear, while "fear" is explained as feelings of anxiety in response to a threat in the environment. For example, a stranger saying "come here" to you in the middle of the night on a dark street would be a threat in the environment.

C) There are 12 different categories of anxiety in psychology. Here are some prominent examples. (Give the participant a brief explanation of each)

- 1) GAD- Generalized Anxiety Disorder. "worry"
 - 2) OCD- Obsessive-Compulsive Disorder
 - 3) Panic
 - 4) Specific Phobias- ex. Fear of heights or fear of dogs
 - 5) PTSD- Post-Traumatic Stress Disorder
-
- 1) ASD- Acute Stress Disorder: During the first month following exposure to a traumatic

event

- 2) Social Phobia: This is the older term that is used in the DSM, but many are urging the use of the name Social Anxiety Disorder and it has been widely accepted.

II) Social Anxiety Disorder (4 minutes)

- A) Where does Public Speaking Anxiety fit in? This is the most common situation reported for social phobia. Some suggest that there should be two separate categories: one for public speaking and one for a generalized social anxiety in a variety of situations.

B) Go over the following abridged version of the DSM IV-TR criteria for Social Phobia:

- 1) A persistent fear of one or more social or performance situations in which they will be observed by others. The individual in some way thinks he or she will embarrass themselves.
 - 2) Exposure to the feared situation almost always produces anxiety, which may include a panic attack.
 - 3) The person realizes the fear is excessive or unreasonable
 - 4) The situation is frequently avoided when possible
 - 5) The anxiety and subsequent avoidance must have a significant impact on the individuals life.
 - 6) Duration of 6 months is required if the individual is 18 or over.
 - 7) Anxiety not the result of substance use or a general medical condition
-
- 1) If it is a result of a general medical condition, the fear is not for something that is a result of the condition. (i.e. trembling in parkinsons disease.)

III) Prevalence Rates/Epidemiological Data (2 minutes)

- A) Social Phobia is the most common type of anxiety disorder and the third most common mental disorder in the population.
- B) Co-morbidity of Social Anxiety Disorder: Avoidant Personality Disorder, Alcohol Abuse, Mood Disorders and other Anxiety Disorders.
- C) Estimated 13.3% lifetime prevalence of Social Anxiety Disorder (*Explain the term lifetime prevalence*)
- D) 85% of people report some level of anxiety in public speaking (high sub-clinical level)
- E) Average age of onset of social phobia is 15 years old.

IV) General Treatment Options (4 minutes)

- A) Exposure: (i.e. facing your fears directly with practice)
- B) Cognitive therapy: (*explain main principle of each*)
 - 1) Cognitive restructuring.
 - 2) Acceptance
- C) Medication:
 - 1) SSRI's: Paxil= 1st drug approved by FDA for Social Anxiety Disorder (1999).
Since then a few others have been approved. This is the only approved category of medications and is the first line of defense as far as medication is concerned.

Appendix I

Speech Instructions

I am now going to ask you to prepare and give a speech about yourself. Your speech will be videotaped and later evaluated by a panel of judges who will rate and compare your speech to other speeches given under similar situations. I would like your speech to cover the following topics:

1. Spend one minute talking about the most difficult adjustment you had to make coming to college.
2. Spend one minute talking about a time when you received negative feedback from a teacher or boss.
3. Spend one minute talking about a time when you had to overcome a conflict or challenge with another person.
4. Spend one minute describing what you consider to be the primary strengths of your personality.
5. Finally, spend the final minute describing what you consider to be the primary weaknesses of your personality.

The speech will need to be five minutes long. You may create notes to help you prepare for the speech, but we encourage you to use them minimally during the actual speech. You will now have 5 minutes to prepare your speech. Please let me know at this time if you have any questions.

Appendix J

Research Assistant Instructions

Thank you for your participation. For this experiment, we are studying the effects of anxiety on public speaking. Specifically, we are focusing on creating an environment that will heighten anxiety through the presence of audience members.

Your role will be to sit silently during the participant's five-minute speech and display noncommittal behavior that offers neither negative nor positive feedback. Do not greet or welcome the participant as they enter the room or engage in communication with them in any way. If the participant directly asks you a question, answer it in the briefest manner possible. Do not smile nor frown, but rather keep body language vague. Examples of noncommittal behavior include displaying little to no welcoming or encouraging body language (such as head-nodding), keeping communication with the participant giving the speech to a minimum, and displaying a moderate amount of eye contact. A moderate amount of eye contact is defined as spending no more than half of each minute engaged in direct eye contact with the participant, with no more than 15 seconds of continuous eye contact.

By having all research assistants displaying the same noncommittal and vague behavior during participant speeches, we are able to keep the level of anxiety produced by this public speaking task consistent for each participant. If you have any questions, please ask the experimenter at this time.

Appendix K

Informed Consent for Participation in the Research Study

Purpose

I understand that the purpose of the research study is to investigate different interventions for public speaking anxiety, and how these treatments affect public speaking performance.

Participants

I understand that I have been asked to participate because I have reported experiencing at least a moderate degree of public speaking anxiety, based on the results of the online survey I took prior to this experiment.

Procedure

I understand that the experimenter will first have me complete four questionnaires. Then I will be provided one of two interventions (each are 15 minutes long) which are intended to help cope with anxiety related to public speaking. Which of the two interventions I receive has already been determined randomly. After completion of the intervention, I will be given five minutes to prepare a five-minute speech about myself, which will be presented to an audience of 2-3 people. After giving the speech, I will be asked to complete another questionnaire. I also understand that the speech I give will be videotaped. The videotape will be used to assess my speech performance and will only be viewed by some members of the principal investigator's research team who are working on this project. The total time commitment for the study will be about 50-60 minutes.

Risks

I understand that there are minimal risks associated with participation in this study. It is possible that I may become anxious or tense during the process of giving this speech, and that these feelings of anxiety may be uncomfortable. If this occurs I can end my participation at any time, and still receive full compensation for participation. If I choose to end my participation during the speech, I can simply raise my hand, and the study will stop. I am also aware that the Minnesota State University, Mankato Counseling Center can provide resources and support for dealing with any anxiety or distress that I may encounter as a result of this study. The phone number for the Counseling Center (507) 389-1455.

Benefits

I understand that this study may result in me gaining new coping methods for dealing with public speaking anxiety. This study may also eventually lead to the development of more effective methods for treating public speaking performance.

Compensation

I understand that in exchange for my participation in this study, I will receive extra credit points that can be applied to my psychology class through the SONA system.

Confidentiality

I understand that my responses and other information collected in this study will be completely confidential. Confidentiality will be protected in that your name or student ID number will not be included on any records collected during this study, including videotapes and questionnaires. Also, all information collected during this study, including videotapes, will be used for research purposes only and will only be accessible to the researcher and his research team. All information will be kept in a locked cabinet in the principal investigator's office and will be destroyed three years following the completion of the study.

Right to Refuse or Withdraw

I understand that participation is voluntary. I understand that I may withdraw from the study at any time without penalty. I understand that my decision as to whether or not to participate will not affect my relationship with Minnesota State University, Mankato, nor will a refusal to participate involve a penalty or loss of benefits. I understand that I will be given the same amount of compensation (extra credit points) regardless of whether I complete the study or not.

Questions

I have been informed that if I have any questions, I am free to ask them. I understand that if I have any additional questions later, I may contact the office of the principal investigator, Jeffrey Buchanan, Ph.D. at (507) 389-5824 or the student investigator, Soultana Mpoulkoura at (408)966-4247, or if you have questions or concerns about the treatment of human subjects, please contact the IRB Administrator and Associate Vice President of Research and Dean of Graduate Studies, Dr. Barry Ries at (507) 389-1242.

Closing Statement

My signature below indicates that I am 18 years of age or older and have decided to participate in a research study and that I have read this form, understand it, and have received a copy of this consent form.

Signature of Participant Date

Signature of Investigator Date

IRBNet #:962649

Appendix L

Participant ID #: _____ **Subjective Units of Discomfort**

On a scale of 0-100, with 0 representing *no distress* and 100 representing *the most conceivable distress*, please rate your discomfort at this moment.

On a scale of 0-100, with 0 representing *no distress* and 100 representing *the most conceivable distress*, please rate your discomfort during the most distressing moment while you were giving your speech.

Please rate how much you used the techniques learned from the intervention to help you manage anxiety experienced during preparation for, and throughout your speech.

Not at all *A little bit* *Somewhat* *Quite a bit*

Please rate how useful the techniques from the intervention were in helping you deal with your anxiety preparing for, and during your speech.

Not at all *A little bit* *Somewhat* *Quite a bit*

On the following rating scale, please rate how distressing it was having a live audience observe your speech.

Not at all distressing *Slightly distressing* *Moderately distressing* *Extremely distressing*

Did the behavior of the people observing your speech increase, decrease, or have no effect on your level of anxiety during the speech?

Decreased anxiety *No effect* *Increased anxiety*

Appendix M

Debriefing Form

(read to participants)

Thank you for participation in this study. We hope that you have gained exposure to potentially useful techniques for managing anxiety during public speaking. If you discover that you have any issues or distress related to the anxiety from this study, or anxiety in general, feel free to contact the University Counseling Center, which can provide valuable resources and support. They can be contacted at (507) 389-1455.

If you have any questions about this study, or would like to learn the results, please contact the principal investigator, Jeffrey Buchanan, Ph.D. at (507) 389-5824, or the student investigator, Soultana Mpoulkoura at (408) 966-4247. Thank you again for your participation.