Do College Students with Public Speaking Anxiety Show an Attentional Bias Toward Threat?

Kristen Ann Frey

Thesis Submitted to the Faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Master of Science in Psychology

George A. Clum, Chair
Martha Ann Bell
Thomas H. Ollendick

June 9, 2009
Blacksburg, Virginia

Keywords: Public Speaking Anxiety, Speech Anxiety, Attentional Bias, Dot- Probe, College Students

Copyright 2009, Kristen Ann Frey
Do College Students with Public Speaking Anxiety Show an Attentional Bias Toward Threat?

Kristen Ann Frey

**ABSTRACT**

Cognitive theories postulate that attention toward threatening information and away from neutral cues plays an etiological role in anxiety. The present study examines whether a preconscious attentional bias (AB) toward threatening stimuli exists in individuals with public speaking anxiety. Participants included 61 undergraduates with high and low speech anxiety. AB was measured using a dot-probe paradigm with threatening and neutral words. Reaction times to dot-probes on threatening and neutral trials were compared between the two groups. Results indicated that, contrary to expectations, high and low speech anxious participants did not differ in their mean reaction times to threat words. Thus, AB may not be measurable in individuals with public speaking anxiety using the method that the current study employed.
DEDICATION

This thesis is dedicated to my parents, Richard and Barbara Frey. Their hard work enabled me to have many opportunities, and their encouragement enabled me to persevere through challenges. They never doubted my abilities and always knew I could do it. Also, this thesis is dedicated to my husband Michael Knepp, who put up with my complaining and meltdowns, and who also helped me with SPSS.
ACKNOWLEDGEMENTS

I would like to thank my advisor, Dr. George Clum, for his assistance in developing the idea for this project and the many hours we spent in meetings deliberating the details of this study. I would further like to acknowledge my committee members, Drs. Martha Ann Bell and Tom Ollendick, for their suggestions and guidance, particularly when the first 24 participants’ data was lost. Also, I would like to thank Clinton Comer for his help and guidance with navigating the E-Prime program. During his busy and demanding first year in the clinical program, he was willing to meet with me to discuss and help create the program we wanted, even during weekends. This project would not have been possible without his assistance.
### TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>iii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>5</td>
</tr>
<tr>
<td>* Hypothesis 1</td>
<td>5</td>
</tr>
<tr>
<td>* Hypothesis 2</td>
<td>6</td>
</tr>
<tr>
<td>METHOD</td>
<td>6</td>
</tr>
<tr>
<td>Participants</td>
<td>6</td>
</tr>
<tr>
<td>Procedure</td>
<td>8</td>
</tr>
<tr>
<td>* Screening Questionnaires – Part I</td>
<td>8</td>
</tr>
<tr>
<td>* Questionnaires and Interview – Part II</td>
<td>9</td>
</tr>
<tr>
<td>* Dot-Probe Task</td>
<td>9</td>
</tr>
<tr>
<td>* Speech Task</td>
<td>11</td>
</tr>
<tr>
<td>Assessment Descriptions and Psychometric Properties</td>
<td>11</td>
</tr>
<tr>
<td>* Personal Report of Public Speaking Anxiety (PRPSA; McCroskey, 1970, 2007)</td>
<td>11</td>
</tr>
<tr>
<td>* State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, &amp; Lushene, 1970)</td>
<td>12</td>
</tr>
<tr>
<td>* Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990)</td>
<td>12</td>
</tr>
<tr>
<td>* Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV; DiNardo, Brown, &amp; Barlow, 1994)</td>
<td>13</td>
</tr>
<tr>
<td>Manipulation Checks</td>
<td>13</td>
</tr>
<tr>
<td>Power Analysis</td>
<td>14</td>
</tr>
<tr>
<td>RESULTS</td>
<td>15</td>
</tr>
<tr>
<td>Group Comparisons on Demographic Factors</td>
<td>15</td>
</tr>
<tr>
<td>Social Phobia</td>
<td>15</td>
</tr>
<tr>
<td>Group Comparisons on Assessment Scores</td>
<td>15</td>
</tr>
<tr>
<td>Correlations: Online and Laboratory Administrations</td>
<td>16</td>
</tr>
<tr>
<td>Comparison of Anxiety Ratings</td>
<td>17</td>
</tr>
<tr>
<td>Comparison of Threat Word Ratings</td>
<td>18</td>
</tr>
<tr>
<td>Dot-Probe Task Analyses</td>
<td>19</td>
</tr>
<tr>
<td>* Hypothesis 1</td>
<td>20</td>
</tr>
<tr>
<td>* Hypothesis 2</td>
<td>20</td>
</tr>
<tr>
<td>Exploratory Analyses</td>
<td>22</td>
</tr>
<tr>
<td>* Number of Errors</td>
<td>22</td>
</tr>
<tr>
<td>* Social Phobia</td>
<td>23</td>
</tr>
<tr>
<td>* Trait Anxiety Level</td>
<td>23</td>
</tr>
<tr>
<td>DISCUSSION</td>
<td>24</td>
</tr>
<tr>
<td>Primary Aims</td>
<td>24</td>
</tr>
<tr>
<td>Assessment Scores and Correlations</td>
<td>25</td>
</tr>
<tr>
<td>Public Speaking Anxiety and Social Phobia</td>
<td>25</td>
</tr>
<tr>
<td>Comparison of Anxiety Ratings</td>
<td>26</td>
</tr>
<tr>
<td>Comparison of Threat Word Ratings</td>
<td>27</td>
</tr>
<tr>
<td>Number of Errors</td>
<td>28</td>
</tr>
<tr>
<td>Social Phobia</td>
<td>28</td>
</tr>
<tr>
<td>Trait Anxiety Level</td>
<td>29</td>
</tr>
</tbody>
</table>
Limitations ........................................................................................................................................ 30
Dot-Probe Task Design .................................................................................................................. 30
Lack of Practice and Filler Trials .................................................................................................... 30
Type of Stimuli Used ...................................................................................................................... 31
Lack of Public Speaking-Related Stimuli ....................................................................................... 32
Lack of Neutral Word Ratings ....................................................................................................... 32
Use of Online Questionnaires ....................................................................................................... 32
Reliance on Self-Report Data ......................................................................................................... 33
Gender Composition ..................................................................................................................... 33
CONCLUSION .................................................................................................................................. 33
REFERENCES .................................................................................................................................. 36
TABLES .......................................................................................................................................... 39
Table 1 ........................................................................................................................................... 39
  Gender Composition of Each Speech Anxiety Group ................................................................. 39
Table 2 ........................................................................................................................................... 40
  Mean Subjective Anxiety Ratings by Speech Anxiety Group .................................................... 40
Table 3 ........................................................................................................................................... 41
  Mean Subjective Word Ratings by Speech Anxiety Group ......................................................... 41
Table 4 ........................................................................................................................................... 42
  Mean Reaction Times (RT) to Threat and Neutral Words by Speech Anxiety Group ............... 42
Table 5 ........................................................................................................................................... 43
  Comparison of Reaction Times by Negative Variable ............................................................... 43
Table 6 ........................................................................................................................................... 44
  Comparison of Reaction Times by Neutral Variable ................................................................. 44
Table 7 ........................................................................................................................................... 45
  Word Type Reaction Times by Speech Anxiety Group ............................................................... 45
Table 8 ........................................................................................................................................... 46
  Word Type Reaction Times (RT) by Social Phobia Group .......................................................... 46
Table 9 ........................................................................................................................................... 47
  Word Type Reaction Times (RT) by Trait Worry Group ............................................................. 47
APPENDICES ................................................................................................................................. 48
Appendix A ..................................................................................................................................... 48
  INFORMED CONSENT FORM .................................................................................................. 48
Appendix B ..................................................................................................................................... 53
  Health History Questionnaire ..................................................................................................... 53
Appendix C ..................................................................................................................................... 57
  Personal Report of Public Speaking Anxiety (PRPSA; McCroskey, 1970, 2007) .................... 57
Appendix D ..................................................................................................................................... 59
  State-Trait Anxiety Inventory – Trait Version (STAI-T; Spielberger, Gorsuch, & Lushene, 1970) 59
Appendix E ..................................................................................................................................... 61
  Penn State Worry Questionnaire (Meyer et al., 1990) ............................................................... 61
Appendix F ..................................................................................................................................... 63
  Threat-Neutral Word Pairs .......................................................................................................... 63
INTRODUCTION

According to nationwide surveys conducted by Bruskin Associates (1973) and Motley (1988), Americans regard public speaking as their number one fear. Speech anxiety frequently plays a large role in one’s work and home life; in particular, a community study found that public speaking fears were associated with lower income and education, as well as increased unemployment (Stein et al., 1996). Such fears may be especially relevant to college students, as public communication skills are becoming increasingly valuable to college graduates. According to Lewis-Holmes (1998), employers demand individuals who are not only competent, but polished, public speakers. Many colleges and universities require students to take public speaking courses. In communication departments, such a course is usually required, whereas in a host of other majors, competence in public speaking is strongly encouraged. Robinson (1997) notes that every semester, instructors of public speaking courses experience the challenge of dealing with anxious students. Given that public speaking anxiety is so common among college students and Americans in general, it is important to understand the factors that contribute to its development and maintenance. However, compared to other anxiety problems, the etiological underpinnings of public speaking anxiety are currently not well-understood.

Selective attention to threat is believed to contribute to the maintenance of other types of anxiety (Gilboa-Schechtman, Foa, & Amir, 1999), but we do not yet know if it relates to speech phobia. According to Spector, Pecknold, and Libman (2003), attention shifts during times of anxiety. Specifically, stimuli relevant to the feared situation or event are highly attended to, while stimuli that are not relevant to the anxiety-provoking situation are less attended to. The idea of an attentional bias (AB) toward threat in anxious individuals was originally put forth by Bower (1981) in his network model, which posits that our attention is biased to material or information that fits with our mood. When we encounter emotionally-valenced information from our environment, we can perceive and attend to aspects of the event or stimulus in several ways. Individuals with a predisposition toward trait anxiety may attend to the threatening or negative aspects of emotional stimuli, as compared to those without a predisposition toward anxiety.

According to Williams, Mathews, and MacLeod (1996), cognitive models of emotional disorders posit that AB “is not simply a by-product of the emotional disorder but plays a vital
role in its maintenance” (p. 3). AB can be thought of as the part of a vicious cycle in which exposure to emotionally-laden stimuli increases anxiety, which in turn increases vigilance for those stimuli. The individual’s anxiety is maintained by his or her tendency to selectively attend to threatening aspects of the environment. We cannot yet determine that AB toward threat is a causal factor in clinical and subclinical anxiety problems, but we recognize its strong influence in the maintenance of anxiety.

Further, AB toward threat varies according to the type of situation that elicits anxiety in the individual. This idea is known as the specificity hypothesis (Heinrichs & Hofmann, 2001). For instance, individuals with social phobia show an AB to social interaction- or performance-related stimuli, as opposed to neutral stimuli or stimuli relevant to other anxiety disorders. In like fashion, individuals with public speaking anxiety are likely to show an AB toward stimuli that revolves around speaking in front of a group.

As previously noted, not much is known about etiological factors for public speaking anxiety. However, information exists about the causes of social anxiety in general. For example, research has shown that individuals with social phobia tend to process information differently than individuals without social anxiety. Socially phobic individuals show an AB toward socially threatening information, including internal manifestations of social anxiety (Spector, Pecknold, & Libman, 2003) and external cues and sources of threat, such as other people’s facial expressions (Gilboa-Schechtman, Foa, & Amir, 1999). This AB becomes especially apparent under conditions of social evaluation (e.g., the threat of giving a public speech; Mansell, Clark, & Ehlers, 2003).

AB can be measured in several ways. One method that researchers have used to measure AB is the Stroop (1935) color-naming task. In the emotional Stroop task, the individual is presented with a series of words, and then asked to name the color in which each word is printed. To do this, the individual must ignore the meaning of the word and only pay attention to the color. However, in many cases, ignoring the word’s meaning and connotations is difficult, especially for anxious individuals who are presented with words that denote anxiety. Reaction time (the amount of time it takes the individual to name the font color) is recorded. Longer latencies to respond are interpreted as a sign that the participant is slow to ignore the meaning of the word and only attend to the font color (Spector, Pecknold, & Libman, 2003).
In Spector, Pecknold, and Libman’s (2003) study measuring AB of socially anxious individuals using the Stroop color task, 18 females and 22 males with generalized social phobia were asked to name the color of words reflecting: 1) fear of negative evaluation, 2) anxiety symptoms that others might notice, 3) anxiety symptoms that others might not notice, and 4) neutral words. The study also included a group of nonanxious controls (14 female and 11 male). Results indicated that individuals with social anxiety showed an AB to negative evaluation words and noticeable anxiety symptom words, but not to less noticeable anxiety symptom words or neutral words. Nonanxious control participants did not show an AB toward negative evaluation words, noticeable anxiety symptom words, less noticeable anxiety symptom words, or neutral words.

Other studies have focused on threatening versus neutral words, but not in a Stroop task format. Some researchers claim that the emotional Stroop task does not measure AB as precisely as a dot-probe task (Ononaiye, Turpin, & Reidy, 2007). Dot-probe tasks are measures of the distribution of visual attention (Heinrichs & Hofmann, 2001). In dot-probe tasks, pairs of words that differ in the type of emotion they convey are displayed on a computer screen, and a dot follows one of the two words. Participants must respond to the presence of the probe by pressing a key on the keyboard. Participants’ latencies to respond (reaction times) are used as a measure of AB. In this case, if the anxious person is attending to the threatening stimuli to begin with, he or she will notice and respond to the probe more quickly. MacLeod, Mathews, and Tata (1986) developed a dot-probe protocol using words with different emotional valences to measure AB in individuals with generalized anxiety disorder (GAD). Results indicated that GAD patients detected probes that appeared in place of aversive words more quickly than they detected probes that appeared in place of neutral words. Individuals without GAD displayed the opposite pattern: they were slower to detect probes that appeared in place of the negative words, as opposed to neutral words. In other words, non-GAD participants did not display the same AB to threat words as the GAD group.

In a study by Asmundson and Stein (1994), 24 participants with generalized social phobia and 20 healthy controls were administered a word-based dot-probe task. The authors included words relevant to social threat (e.g., foolish) and words relevant to physical threat and panic (e.g., dizzy). Additionally, neutral words were included in the dot-probe paradigm, which were paired with threat words. Researchers found that the socially phobic group showed an AB
toward socially threatening words, but not physically threatening words. The healthy controls did not show an AB toward any word type. Results of this study support the specificity hypothesis, as socially anxious participants showed a distinct AB toward stimuli relevant to their anxiety type. At the same time, socially anxious participants did not show an AB toward threat words related to other types of anxiety (e.g., panic).

Ononaiye, Turpin, and Reidy (2007) examined AB to different categories of threatening words in individuals with subclinical social anxiety and individuals without social anxiety. The four categories of words were negative evaluation, social situations, somatic sensations, and physical threat (16 words in each category). Each word was matched with a nonthreatening (neutral) word and the two were presented together. In addition to the threat-neutral word trials, the researchers included 144 neutral-neutral word trials to act as fillers. Results showed an AB for words that were physically threatening in the group with social anxiety, but not for other types of anxiety words. Perhaps participants did not show an AB to other anxiety word types because their anxiety was insufficiently primed prior to those tasks. If participants were not feeling as anxious during the presentation of the three remaining word groups, it is likely that they would not show an AB to those types of words.

Prior research has attempted to pinpoint the exact nature of AB and information processing in individuals with social anxiety. Recent studies have suggested that social phobics show increased self-focus under conditions of social evaluation. A study by Mansell, Clark, and Ehlers (2003) showed that individuals with social phobia were quicker to detect perceived changes in their physiological responding after they were told that they would be giving a public presentation. However, their internally-focused bias disappeared when there was no impending social threat. Similarly, in the same study, socially anxious participants who were tested under conditions of social-evaluative threat showed an AB away from faces, indicating that externally-focused attention was reduced. Socially phobic participants were quicker to detect household objects under conditions of social evaluation as compared to faces. In comparison, low-anxious individuals did not show an AB at all.

Fear of public speaking may resemble subclinical social phobia in nature, as individuals with subclinical or discrete social phobia may have a strong and persistent fear of some social or performance situations (e.g., speaking in front of a group). Giving a public speech represents a social threat to many people, regardless of whether they have social phobia. Thus, it is possible
that an AB toward threatening stimuli, especially threatening stimuli that are self-focused, will be present in those with speech anxiety. The goals of the present study, then, were two-fold. The first goal was to determine whether individuals with public speaking anxiety display an AB toward threatening, as opposed to neutral, words when compared to individuals without speech anxiety. The second goal was to determine if individuals with speech anxiety have an AB to certain types of threatening words. That is, were individuals with public speaking anxiety (like those with social phobia) more likely to attend to information that is self-focused, as opposed to externally-focused? Or were they likely to show an AB to both types of threatening stimuli?

The present study was also designed to address shortcomings of the Ononaiye, Turpin, and Reidy (2007) study. As noted earlier, Ononaiye, Turpin, and Reidy may not have sufficiently primed participants for anxiety prior to the dot-probe task. This potentially insufficient priming may explain, at least in part, why the authors failed to detect a significant AB for stimuli related to social phobia. Moreover, in the Ononaiye et al. study, graduate research assistants, rather than research participants, rated the threat quality of the dot-probe task words. Thus, it is unknown if the participants actually found the stimuli threatening or anxiety-producing. Lastly, Ononaiye and colleagues did not use a diagnostic interview for social phobia; rather, social anxiety groups were determined according to participants’ scores on a self-report questionnaire (the Social Avoidance and Distress Scale; Watson & Friend, 1969).

As previously noted, the social phobia literature reveals the existence of a clear AB toward threat in socially anxious individuals. Such information has informed social phobia treatment, as a treatment protocol was developed that targets AB specifically (attention retraining; e.g., Hazen, Vasey, & Schmidt, 2009). However, before public speaking anxiety can be treated using AB principles, it must be determined whether an AB toward threat exists in speech phobic individuals in the first place. If evidence for such a bias is found, it makes sense to treat public speaking anxiety using AB modification (i.e., attention retraining) in a future study.

Hypotheses

Hypothesis 1. Relative to low speech anxious individuals, high speech anxious participants will show an AB to threatening words. Therefore, a two-way interaction between
stimulus type (threatening versus neutral) and group (high speech anxiety versus low speech anxiety) is predicted. Those in the high speech anxiety group will show the bias when the dot-probe replaces threatening words, rather than neutral words, as compared to the low speech anxiety group.

Hypothesis 2. A difference is predicted between the specific types of threatening words that will produce an AB in the high speech anxiety group. In particular, it is expected that words relevant to somatic sensations and negative evaluation will produce an AB in those with high speech anxiety, as these words convey the greatest amount of internal focus. It is also expected that words relevant to social situations will produce an AB, as these words convey the greatest amount of public speaking anxiety focus; a bias to these words would be consistent with the specificity hypothesis. Thus, an interaction between threatening word type and speech anxiety group is predicted.

METHOD

This study examined whether an AB for threatening stimuli exists in individuals with public speaking anxiety using a computerized dot-probe task. Next, this study examined specific types of stimuli toward which speech anxious individuals show the largest AB.

Participants

The study included a sample of 30 individuals who scored high on a measure of speech anxiety and 31 individuals who scored low on the same measure of speech anxiety. Participants were recruited from the Department of Psychology via the Sona experiment management system. Students enrolled in Introductory Psychology and other departmental courses are permitted to receive up to 10 points of extra credit by participating in ongoing research experiments. Typically, students earn one point of extra credit per hour of research participation. In addition, eight students from the Pamplin College of Business took part in the online portion of the study, while two business students took part in the laboratory portion. These students received extra credit for their participation as well, but the amount of extra credit received was determined by their course instructor. The Sona system advertised the study beginning in February 2009; thus,
only students enrolled in psychology courses during the spring 2009 semester were eligible to participate.

The study contained two parts. Part I was completed online; participants who signed up via the Sona system were provided with a link to a questionnaire on survey.vt.edu. The investigator used the survey.vt.edu Web site to create questionnaires that assessed public speaking anxiety, worry, and trait anxiety (as described below). Individuals who completed Part I received one extra credit point, regardless of whether they met criteria for Part II. Those who met inclusion criteria based on their survey scores were contacted via email regarding Part II (the laboratory portion). Part II was advertised on Sona as an invitation-only study; therefore, only students who met qualification criteria could sign up. Students who met qualification criteria were provided with an invitation code in the email message from the researcher. Individuals who signed up for Part II using the Sona system were instructed to enter this invitation code.

Of the students that completed the Part I survey (N = 951), 460 (48%) were invited to participate in Part II. Of the students who met criteria for Part II, 100 (22%) signed up to participate. Of those who signed up to participate, 86 (86%) students reported to the lab (the remaining 14 students either no-showed to the lab or cancelled their lab session). Of the 86 students who reported to Part II, one student dropped out of the study after the informed consent process (this individual was in the high speech anxiety group and dropped out of the study upon being informed that she would have to give a 3-minute speech).

To be included in the high speech anxiety group, individuals needed to score greater than 131 on a self-report measure of public speaking anxiety (described below). To be included in the low speech anxiety group, students needed to score below 98 on the same measure. Those who scored between 98 and 131 were not eligible to participate in the laboratory portion of the study, as the researcher was interested only in cases of low and high public speaking anxiety (rather than borderline or moderate cases).

Eighty-five students completed their experimental session (55 females, 30 males). However, the first 24 participants were excluded from the analyses due to an error in the experimental procedure they completed; thus, 61 participants (31 from the low speech anxiety group and 30 from the high speech anxiety group) remained for the analyses presented below. In the high speech anxiety group included in the analyses (n = 30), 21 participants were female. In the low speech anxiety group (n = 31), 19 participants were female. Individuals ranged in age
from 18 to 28 ($M = 19.42, SD = .21$). All individuals who completed their Part II lab session received an additional extra credit point. Moreover, individuals who completed Part II were entered into drawings for three separate gift cards to a large chain store.

Participants were required to be at least 18 years of age. All participants were Virginia Tech undergraduates, but came from a variety of academic disciplines (students university-wide frequently take Introductory Psychology and other psychology courses to satisfy general education requirements). In addition, as noted earlier, eight students who completed Part I were enrolled in the Pamplin College of Business and were not presently taking psychology courses; two of those students completed Part II (one high speech anxiety participant and one low speech anxiety participant). Students were recruited without regard to gender or year in school (freshman through senior).

Procedure

**Screening Questionnaires – Part I.** Initially, all participants were administered a self-report questionnaire designed to tap into public speaking fears. In Part I, all participants completed the Personal Report of Public Speaking Anxiety (PRPSA; McCroskey, 1970, 2007) to determine their level of public speaking anxiety. The PRPSA is a 34-question measure designed to assess fears about giving a speech in front of a group. A score greater than 131 indicates a high degree of public speaking anxiety. A score below 98 indicates a low degree of public speaking anxiety, and a score between 98 and 131 corresponds with moderate public speaking anxiety.

As in a study by Anderson, Rothbaum, and Hodges (2003), participants completed the trait dimension of the State-Trait Anxiety Inventory (STAI-T; Spielberger, Gorsuch, & Lushene, 1970) to measure trait levels of anxiety. To further assess worry on a broad level, participants completed the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990). The purpose of administering these two additional screening measures was to obtain a more complete picture of each participant’s overall anxiety. An individual may not suffer from public speaking anxiety according to the PRPSA, but may be experiencing other types of anxiety symptoms, according to the STAI-T and/or PSWQ.
Only PRPSA scores were used to determine group membership; scores on the PSWQ and STAI-T were not examined. The researcher did not exclude individuals based on PSWQ or STAI-T scores due to a concern that doing so would rule out too many participants. The investigator recognized that individuals who were low in speech anxiety, but high in other types of anxiety may show an AB for threatening stimuli.

**Questionnaires and Interview – Part II.** Lab sessions were completed in a small room in the psychology building (Williams Hall) at Virginia Tech. The laboratory room contained a table and two chairs, as well as a laptop computer. To begin the lab session, the investigator greeted the participant and reviewed the informed consent document with him or her (Appendix A). Participants were given the opportunity to ask questions about the consent form and experiment before signing the document. Next, the investigator gave each participant a packet of forms. First, participants completed a 3-page form assessing their physical and mental health history (Appendix B). Second, participants re-completed the PRPSA, PSWQ, and STAI-T that they had completed online in Part I.

After the participants completed these forms, the experimenter administered the social phobia module of the Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV; DiNardo, Brown, & Barlow, 1994). This module of the ADIS-IV was used to assess any co-occurring social anxiety problems. Of the 61 students who completed Part II and whose data were retained, three (5%) met clinical criteria for social phobia; all three students were in the high speech anxiety group. The social phobia module of the ADIS-IV was also administered to ensure that participants in the low speech anxiety group did not meet criteria for this disorder. If they had met criteria, one might expect that such students would show an AB to threatening words in the dot-probe task.

**Dot-Probe Task.** To create the dot-probe task, the software program E-Prime, Version 1.1 (Psychology Software Tools, Inc.) was used. E-Prime is a software applications suite that is commonly used to create psychological experiments. E-Prime contains applications that create the experiment, run the experiment, and download the results of the experiment to a statistical software package.

To measure whether an AB existed in those with public speaking anxiety, the dot-probe emotional word task utilized by Ononaiye, Turpin, and Reidy (2007) was used. Participants were presented with 16 words depicting negative evaluation (e.g., embarrassed, failure), social
situations (e.g., conversation, public), somatic sensations (e.g., sweating, nervous), and physical threat (e.g., emergency, injury). In addition, 64 neutral words were matched with each threatening word; these neutral words were obtained from an attention bias software program developed by the Cognition and Emotion Laboratory at the University of Western Australia. Word pairs are presented in Appendix F. All neutral words were matched with a threat word according to word length (i.e., number of letters).

To begin, one threatening word and one neutral word were randomly selected by the E-Prime program. The task was programmed so that negative evaluation words from the overall threat word category would appear first, followed by somatic words, social words, and physical threat words (a total of 64 trials). This method of “blocking” with respect to the four threat word categories was utilized, as opposed to allowing each threat word – regardless of category – to appear randomly throughout the protocol. It is unclear if previous studies (e.g., Ononaiye et al., 2007) have used this method of word blocking, but it was used in the current study for the ease of grouping the four threat word categories for further analysis as part of hypothesis 2. The program then cycled through this order of threat word categories again for another 64 trials (a grand total of 128 trials), but the specific word that appeared from each category was randomly chosen (therefore, the participants did not see the same words in the same order for a second time).

All words were shown on a standard-size Dell laptop monitor. A set of instructions appeared on the screen first to ensure that the participant understood the task. After the participant pressed the space bar to begin, two words were shown simultaneously, one on top of another: a threatening word and a neutral word. In approximately 50% of trials, the neutral word appeared on the top part of the screen (the location of the word – top or bottom – was randomly selected for each trial). After 500 ms, one of the words disappeared (either the word on top or the word on bottom). The dot-probe then appeared on the screen in the location of the word that disappeared. The participant’s task was to press the “1” or “2” key as soon as he or she detected the dot-probe. The participant pressed “1” if the probe replaced the word on top. He or she pressed “2” if the probe replaced the word on bottom. The dot-probe appeared in place of the neutral or threatening words with equal frequency (whether the dot-probe replaced the neutral or threat word was randomly selected by the program). Latency of response to press the “1” or “2” key (reaction time) was recorded by the computer program for each trial. Reaction time served
as the dependent measure. After the participant pressed a key, the next trial of words appeared; the intertrial interval was 500 ms. The next trial of words appeared regardless of whether the participant pressed the correct or incorrect key in response to the dot-probe.

**Speech Task.** The investigator read a set of instructions to the participant regarding the speech task. The participant was told that the speech could be on a topic of his or her choice, and the speech should last 3 minutes. If the participant expressed anxiety or concern about his or her ability to speak for 3 minutes or think of a topic, the experimenter instructed the student to try his or her best, and suggested general speech topics (e.g., “Tell me about yourself”). The experimenter then left the room for 3 minutes as the participant prepared. Most students elected to use the piece of scratch paper provided to them to jot down notes and gather their thoughts. Students were told that they were permitted to use the scratch paper notes while delivering the speech if they wished, although this was not required. Participants commonly chose to deliver their speeches on topics such as: events or organizations they were involved in, why they decided to attend Virginia Tech, their sorority or fraternity’s philanthropy projects, their pets, an autobiography of themselves, or the profession they wished to enter following graduation.

When the investigator returned after 3 minutes had elapsed, the participant was instructed to stand in the front of the room (about 5 feet in front of the experimenter, who remained seated throughout the speech). The experimenter kept track of time for each participant. Participants who stopped speaking well before the 3-minute time limit were encouraged to continue speaking. If the participant stopped speaking a second time before the 3 minutes had elapsed, he or she was not forced to continue. On the other hand, participants who continued to speak after the 3-minute mark were instructed to stop speaking. Once the speech had concluded, the participant took a seat and rated his or her subjective anxiety for a third time, using the same 0 to 10 scale.

**Assessment Descriptions and Psychometric Properties**

**Personal Report of Public Speaking Anxiety (PRPSA; McCroskey, 1970, 2007).** The PRPSA (Appendix C) consists of 34 items that tap into fears about speaking in front of a group. The participant must rate each statement according to how much it applies to him or her. A 5-point scale is used (strongly agree, agree, neutral, disagree, or strongly disagree). Questions on the PRPSA assess public speaking anxiety according to the participant’s past experiences with
preparing for and delivering speeches. Items are cognitive (e.g., “My mind is clear when giving a speech” or “My thoughts become confused and jumbled when I am giving a speech”), physiological (e.g., “My heart beats very fast just as I start a speech” or “I perspire just before starting a speech”), and social-evaluative (e.g., “I get anxious if someone asks me something about my topic that I don’t know”). Other items assess the participant’s subjective experience of anxious feelings leading up to or during the speech (e.g., “I feel anxious when the teacher announces the date of a speaking assignment” or “I do poorer on speeches because I am anxious”). Scores on the PRPSA range from 34 to 170 (population $M = 114.6$, $SD = 17.2$). As previously noted, a score above 131 indicates a high level of public speaking anxiety in general. An overall score below 98 indicates a low level of public speaking anxiety, and a score between 98 and 131 indicates a moderate level. The measure is highly reliable (alpha estimates $> .90$), but focuses solely on public speaking anxiety, as opposed to other communication apprehension domains.

State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). This questionnaire contains two subscales – a state and trait subscale – designed to tap into different domains of anxiety (although the present study used only the trait questionnaire). Trait anxiety “refers to relatively stable individual differences in anxiety-proneness” or “differences between people in the tendency to perceive stressful situations as dangerous or threatening” (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983, p. 1). The trait version of the questionnaire (STAI-T) instructs the examinee to answer questions according to how he or she generally feels. The STAI-T contains 20 items to which the participant must respond “almost never,” “sometimes,” “often,” or “almost always.” Each of these responses is given a weighted score of 1 to 4. Scores can range between 20 and 80. The STAI-T has been shown to exhibit good reliability and internal consistency, as well as convergent, construct, and discriminant validity (Spielberger et al., 1983). The trait version of the STAI that was administered to participants in the current study is presented in Appendix D.

Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990). Commonly used as a brief screening tool for generalized anxiety disorder (GAD), the PSWQ (Appendix E) consists of 16 items that tap into worry uncontrollability, excessiveness, and intensity (Turk & Wolanin, 2006). The participant responds on a scale of 1 (not at all typical of me) to 5 (very typical of me) to each question. The higher one’s overall score, the higher the level of pathological worry. A score of
53 has been suggested as the cutoff point distinguishing those with GAD from controls, according to Turk and Wolanin. This assessment instrument has demonstrated good internal consistency, test-retest reliability, and validity (Meyer et al., 1990). In addition, its discriminant validity is such that the PSWQ can reliably distinguish GAD from other anxiety disorders.

Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV; DiNardo, Brown, & Barlow, 1994). The ADIS-IV is a semi-structured interview that assesses for the presence of each anxiety disorder according to DSM-IV (American Psychiatric Association, 1994) criteria. In addition, the interview assesses for other common comorbid conditions (e.g., mood disorders, substance abuse and dependence) and disorders that overlap with anxiety. According to Turk, Heimberg, and Hope (2001), the ADIS-IV has demonstrated satisfactory reliability (kappa = .64) in the diagnosis of social phobia. Further, the ADIS-IV can be used reliably for the purposes of differential diagnosis.

Manipulation Checks

The researchers reasoned it was possible, even among the speech phobic group members, that threatening words would generate different amounts of anxiety in every participant. In other words, it was predicted that participants may show an idiosyncratic AB to some types of threatening stimuli, but not to other types. One member of the speech anxious group may find a specific word or category of words to be anxiety-provoking, while another participant in the speech anxious group may not. Both types of words are threat-related, but would not necessarily produce an anxious response in all participants. Therefore, as a manipulation check, the investigator asked each participant to rate, on a scale of 0 (no anxiety) to 10 (maximum anxiety), how much anxiety he or she experienced after reading each threatening word. Participants from both groups (high and low speech anxiety) took part in this manipulation check.

The experimenter provided each student with a sheet of paper that contained all 64 threatening words from the dot-probe task. The participant was instructed to rate the amount of anxiety generated by each threatening word. If the participant was confused by the general instructions provided, the experimenter provided additional clarification. Specifically, the investigator instructed the participant to rate how anxiety-provoking the word was to him or her (not necessarily in a specific context). The word ratings took each participant 5 to 10 minutes to
complete. After completing this task, the participant was told that he or she had completed the experiment and was given the opportunity to ask remaining questions.

A second manipulation check took place when participants rated their anxiety three separate times on a 0 to 10 scale (before being told that they would give a speech, after being told that they would give a speech, and after giving the speech). This manipulation check was used to ensure that anxious participants were sufficiently primed before they began the dot-probe task. The manipulation check was also designed to determine whether high speech anxious and low speech anxious participants differed in anxiety levels when told they must engage in a public speaking task.

A third manipulation check was carried out at the study’s completion to ensure that both high and low anxiety groups significantly differed in their levels of speech anxiety. Based on participants’ lab scores on the PRPSA, a one-way ANOVA was conducted to test for significant differences between the two groups in terms of their speech anxiety levels. A significant difference between the two groups on a measure of public speaking anxiety would provide additional confidence that the two groups differed in anxiety levels at the outset. Thus, any differences in AB could be more reliably attributed to differences in speech anxiety levels at the start of the study.

Power Analysis

Using the G*Power software program (Faul, Erdfelder, Lang, & Buchner, 2007), the researcher selected the “F tests” option from the “test family” pulldown menu, and “fixed effects, special, main effects and interactions” option from the “statistical test” pulldown menu. Next, the experimenter chose “a priori: compute required sample size” from the “type of power analysis” menu. The researcher then entered desired values for power (.8), alpha level (.05), and effect size (.4). This medium effect size was chosen because AB studies to date have not been conducted with speech phobics, but such studies with social phobics have yielded medium to large effect sizes (e.g., Ononaiye, Turpin, & Reidy, 2007). The resulting sample size was 52 (which was rounded upward to 60). The final sample contains 61 students: 31 in the low speech anxiety group and 30 in the high speech anxiety group.
RESULTS

Group Comparisons on Demographic Factors

The two speech anxiety groups did not significantly differ in age ($M = 19.42$ years, $SD = .21$). The mean age for the low speech anxiety group was $19.03$ years ($SD = .30$), while the mean age for the high speech anxiety group was $19.80$ years ($SD = .30$). This difference in age was nonsignificant, but did represent a trend toward significance ($p = .08$), such that the high speech anxiety group tended to be slightly older than the low speech anxiety group. In terms of gender composition, the two speech anxiety groups did not significantly differ. Table 1 displays the gender composition of each group.

Social Phobia

Of the 61 students included in the final analyses, three (5%) met criteria for a DSM-IV (American Psychiatric Association, 1994) diagnosis of social phobia, according to the ADIS-IV. Such a percentage is slightly less than the overall prevalence of social phobia in the American adult population (6.8%; NIMH, 2009). All three individuals meeting criteria for a social phobia diagnosis were in the high speech anxiety group (10%).

Group Comparisons on Assessment Scores

First, one-way ANOVAs were conducted to ensure that both groups differed in terms of their public speaking anxiety levels online and in the lab, as measured by the PRPSA. The mean online PRPSA score for the 61 participants included in the lab study was $110.44$ ($SD = 35.04$); online PRPSA scores ranged from 44 to 169 in this sample. Within the low speech anxiety group, the mean online PRPSA score was $78.97$ ($SD = 15.58$). Within the high speech anxiety group, the mean online PRPSA score was $142.97$ ($SD = 11.64$). These two online means were significantly different from one another ($F[1,59] = 328.72, p < .001$). The two speech anxiety groups significantly differed in their online-administered PSWQ ($F[1,59] = 38.08, p < .001$) and STAI-T ($F[1,58] = 27.36, p < .001$) scores as well (one participant in the low speech anxiety
group was excluded from analysis of the online STAI-T because she left one question blank. The overall means for the online-administered PSWQ and STAI-T were 53.77 (SD = 13.51) and 41.10 (SD = 10.69), respectively. Online PSWQ scores ranged from 28 to 76, while online STAI-T scores ranged from 23 to 65. Within the low speech anxiety group, the mean PSWQ score was 45.52 (SD = 12.73); within the high speech anxiety group, the mean score was 62.30 (SD = 7.86). In regard to the STAI-T, the mean score was 35.10 (SD = 7.33) for the low speech anxious group and 47.10 (SD = 10.21) for the high speech anxious group.

Laboratory PRPSA scores ranged from 40 to 166 (M = 108.23, SD = 36.75). The mean laboratory PRPSA score in the low speech anxiety group was 75.32 (SD = 16.56), while the mean PRPSA score in the high speech anxiety group was 142.23 (SD = 12.53). The difference between the low and high speech anxiety groups in terms of lab PRPSA score was significant (F[1,59] = 315.21, p < .001). The two groups also significantly differed in their laboratory PSWQ (F[1,59] = 58.60, p < .001) and STAI-T (F[1,59] = 35.43, p < .001) scores, even though such a difference was not explicitly predicted. The mean PSWQ score for the low speech anxiety group was 39.74 (SD = 11.69), while the mean PSWQ score for the high speech anxiety group was 60.17 (SD = 8.92). The mean STAI-T scores were 32.45 and 44.30 (SD = 6.52 and 8.88) for the low and high speech anxiety groups, respectively. Laboratory PSWQ scores ranged from 22 to 74, while laboratory STAI-T scores ranged from 24 to 60. The correlation between the laboratory PSWQ (M = 49.79, SD = 14.59) and STAI-T (M = 38.28, SD = 9.75) scores was significant, r(59) = .77, p = .01. Similarly, the correlation between the laboratory PSWQ and PRPSA (M = 108.23, SD = 36.75) was significant, r(59) = .78, p = .01. In addition, the correlation between the laboratory STAI-T and PRPSA was significant, r(59) = .68, p = .01.

**Correlations: Online and Laboratory Administrations**

Pearson’s correlations between online and laboratory scores were conducted for each of the three anxiety assessments (PRPSA, PSWQ, and STAI-T). Such correlations were obtained to ensure that all participants, regardless of speech anxiety group, had completed each administration of the assessments reliably. The online and laboratory administrations of the PRPSA were significantly correlated, r(59) = .97, p < .001. Further, a significant correlation existed between the online and laboratory administrations of the PSWQ, r(59) = .87, p < .001.
Finally, a significant correlation was found between the online and laboratory administrations of the STAI-T, \( r(58) = .84, p < .001 \).

Comparison of Anxiety Ratings

Participants were asked to subjectively rate their current anxiety level on a scale of 0 to 10 (0 = no anxiety; 10 = maximum anxiety) at three separate points during the lab study. To ensure that participants in the high speech anxiety group responded to the public speaking task with greater anxiety than participants in the low speech anxiety group, a group (high and low anxious) x time (baseline, pre-speech and post-speech) ANOVA was conducted. Table 2 displays the mean anxiety ratings by group at each of the three time points. The ANOVA revealed a significant interaction between time point and speech anxiety group, \( F(2,118) = 5.53, p < .01 \).

Notably, the high speech anxiety group reported significantly higher subjective anxiety levels at all three time points. Therefore, as compared to low speech anxiety participants, high speech anxiety participants were more anxious at the start of the experiment (i.e., at baseline; rating 1), as well as after being told that they would give a 3-minute speech (rating 2). Moreover, high speech anxiety participants were more anxious than low speech anxiety participants after delivering their speeches (rating 3).

Additionally, when each speech anxiety group was analyzed individually, a main effect for anxiety rating existed. Within the low speech anxiety group, the main effect for anxiety rating was as follows: \( F(2,60) = 4.69, p = .01 \). Within the high speech anxiety group, the main effect for anxiety rating was as follows: \( F(2,58) = 19.53, p < .001 \). Therefore, among both groups, anxiety ratings increased over time (i.e., from time 1 to time 3). When the anxiety ratings of the low speech anxiety group were examined using pairwise comparisons, significant differences were detected between rating 1 and rating 2 (\( p < .003 \)), as well as rating 1 and rating 3 (\( p = .02 \)). The difference between ratings 2 and 3 was not significant. The high speech anxiety group followed a similar pattern. Pairwise comparisons revealed a significant difference between ratings 1 and 2 (\( p < .001 \)), as well as ratings 1 and 3 (\( p < .001 \)). However, the difference between ratings 2 and 3 was not significant.
To further investigate the interaction, the researcher analyzed the difference in anxiety rating 2 as compared to anxiety rating 1. That is, the investigator wanted to determine if participants in the high speech anxiety group became significantly more anxious than participants in the low speech anxiety group after being told about the 3-minute speech task (as compared to their baseline anxiety rating). A new dependent variable was created in which anxiety rating 1 was subtracted from anxiety rating 2. The mean increase in subjective anxiety level from time 1 to time 2 was .61 (SD = 1.02) for the low speech anxiety group, and 1.87 (SD = 1.01) for the high speech anxiety group. This difference between the two groups was statistically significant ($F[1,59] = 23.25$, $p < .001$). Such a difference suggests that, although speech anxious participants subjectively rated their anxiety levels higher than low speech anxiety participants at time 1, a ceiling effect was not obtained at time 2. In other words, after being told about the 3-minute speech task, participants in the high speech anxiety group displayed a significantly larger difference from their baseline anxiety rating, as compared to the low speech anxiety group. Further, although both groups experienced an increase in anxiety ratings from time 1 to time 3, the high speech anxiety group showed a significantly greater increase at each time point, as compared to low speech anxious individuals.

**Comparison of Threat Word Ratings**

As another manipulation check, participants in both speech anxiety groups were instructed to rate the threatening words for the level of threat or anxiety each word generated, on a scale of 0 (not at all threatening) to 10 (maximally threatening). The researcher wanted to ensure that the stimuli used in the dot-probe task generated more subjective threat in high speech anxiety participants than in low speech anxiety participants. The 64 words were grouped into four categories of 16 words each: 1) negative evaluation, 2) somatic sensations, 3) social situations, and 4) physical threat. For each of the 61 participants, word ratings were averaged within the four categories of threatening words. Therefore, four separate averages were calculated for each participant (a negative evaluation word average, a somatic word average, a social word average, and a physical threat word average). Next, a grand mean rating was obtained for each of the four word categories among the two anxiety groups.
Table 3 displays the grand mean ratings for each of the four word categories among both anxiety groups. A significant group x word type interaction was detected, $F(3,177) = 4.64, p < .001$. When the direction of this interaction was examined, the researcher found that participants in the high speech anxiety group rated all four categories of threat words as significantly more threatening than the low speech anxiety group, as summarized in Table 3. Due to the presence of the significant interaction, the two speech anxiety groups were examined individually in regard to threat word ratings, as the interaction suggested that some word types were more subjectively threatening than others. In the low speech anxiety group, there was a main effect for word type, $F(3,90) = 19.73, p < .001$. Specifically, a significant difference in word ratings existed between negative evaluation and somatic sensation words ($p < .001$), negative evaluation and social words ($p < .001$), somatic and social words ($p = .01$), somatic and physical threat words ($p < .001$), and social and physical threat words ($p < .001$). The only nonsignificant difference was between negative evaluation and physical threat words. Individuals in the low speech anxiety group rated social words as least threatening; the mean social threat word rating was 1.78 ($SD = 1.35$). On the other hand, low speech anxious participants rated negative evaluation words as most threatening, with a mean rating of 4.15 ($SD = 2.44$).

A similar pattern was detected among high speech anxious group members. A main effect for word type was found, $F(3,87) = 15.57, p < .001$. In particular, a significant word rating difference existed between negative evaluation and somatic words ($p < .001$), negative evaluation and social words ($p < .001$), somatic and social words ($p = .02$), somatic and physical threat words ($p < .001$), and social and physical threat words ($p = .03$). Like low speech anxious group members, high speech anxious group members rated negative evaluation words as most threatening, with a mean rating of 5.62 ($SD = 1.86$). In contrast, they rated somatic words as least threatening, with a mean rating of 3.64 ($SD = 1.72$). Overall, even though both speech anxiety groups rated some word types as significantly more threatening than other word types, the high speech anxiety group rated these four threat word types as significantly more threatening than low speech anxious participants.

*Dot-Probe Task Analyses*
Hypothesis 1. Relative to low speech anxious individuals, it was predicted that high speech anxious participants would show an AB to threatening stimuli in the dot-probe task. It was anticipated that the high speech anxiety group would show significantly faster reaction times during trials in which the dot-probe replaced a threatening word (as compared to a neutral word). In this way, a 2 (word type) x 2 (speech anxiety group) interaction was predicted.

To test this hypothesis, a 2 x 2 repeated measures ANOVA was conducted in which word type served as the within-subjects factor, and speech anxiety group served as the between-subjects factor. In Table 4, the mean reaction times for both neutral and threatening words in each speech anxiety group are displayed. RT denotes reaction time, and all reaction times are given in milliseconds (ms).

According to this data, high speech anxiety participants did not respond faster to threat stimuli versus neutral stimuli, and did not display differentially faster reaction times to threat stimuli as compared to the low speech anxiety group. As a consequence, the interaction between word type and speech anxiety group was not significant in this 2 x 2 ANOVA, contrary to expectations.

Hypothesis 2. The researcher predicted that a difference would exist between the two speech anxiety groups on certain types of threatening words. Specifically, it was expected that words relevant to somatic sensations, negative evaluation, and social situations would produce faster reaction times in the high speech anxiety relative to the low speech anxiety group. In this way, a two-way interaction was predicted between word type and speech anxiety group, but unlike hypothesis 1, hypothesis 2 analyses examined word type according to five levels (four types of threat words plus neutral words), rather than two levels (threat and neutral words).

To test hypothesis 2, a 2 x 5 repeated measures ANOVA was conducted in which the following five word types were entered: 1) neutral, 2) negative, 3) somatic, 4) social, and 5) physical threat. In this analysis, a significant within-subjects main effect existed for word type ($F[4,236] = 11.73, p < .001$). When this significant main effect was explored further using pairwise comparisons, the researcher found that the reaction times for negative evaluation words were significantly longer than the reaction times for all other word types ($p < .001$ for each comparison). One explanation for this might be that negative evaluation words appeared first in the experimental paradigm, and that response latencies decreased as participants became accustomed to the task.
To test this possibility, analyses were conducted a second time with a different negative reaction time variable. A new negative reaction time variable, termed negative2, was calculated by removing the reaction times for the first 16 trials in the task (trials 1 – 16 in the 128-trial paradigm), while retaining the reaction times for the second set of 16 negative words (trials 65 – 80 in the 128-trial paradigm). Table 5 displays the significant difference between the negative and negative2 variables in terms of reaction time. Because of this significant difference, the 2 x 5 repeated measures ANOVA presented herein contains the negative2 variable.

At the same time, it was recognized that, during the first 16 trials of the 128-trial task, participants could have been responding to neutral words (and not just negative evaluation threat words), as the program randomly selects whether a neutral or threat word is replaced by the dot-probe. Therefore, the experimenter created a second neutral reaction time variable, neutral2, with the intent of testing whether neutral2 significantly differed from neutral. Like the negative2 variable, the neutral2 variable was calculated as the mean reaction time to this specific word type, with the first 16 trials of the experiment removed. The reaction time differences between the neutral and neutral2 variables were indeed significant, as shown in Table 6. As a consequence, the variable neutral2 is used herein as a replacement for neutral. Further, the 2 x 2 repeated measures ANOVA in which threat word reaction times were compared to neutral word reaction times was conducted a second time using the neutral2 variable instead of the neutral variable. As was the case when the neutral variable was entered into the analyses, the results of this ANOVA were not significant.

The mean reaction times for each of the five groups of threatening words by speech anxiety group are presented in Table 7. In the accompanying 2 x 5 repeated measures ANOVA, the researcher substituted the neutral and negative variables for neutral2 and negative2, respectively. Nonetheless, as was the case when the original neutral and negative variables were used, the resulting interaction term between word type and speech anxiety group was not significant.

The researcher also tested whether the first set of trials for somatic words (trials 17 – 32), social words (trials 33 – 48), and physical threat words (trials 49 – 64) significantly differed from the second set of trials for those word types (trials 81 – 96 for somatic words, trials 97 – 112 for social words, and trials 113 – 128 for physical threat words). These comparisons were conducted in light of the finding that the first set of trials for negative evaluation words (trials 1 –
16) significantly differed from the second set of trials (trials 65 – 80). Results of this within-subjects ANOVA indicated that, for somatic words, a significant difference existed between trial sets, $F(1, 60) = 4.77, p = .03$. Specifically, participants took significantly longer to respond to somatic words in trials 17 – 32, as compared to trials 81 – 96 of the dot-probe experiment. When social words and physical threat words were examined in the same fashion, the researcher did not detect a significant difference between trial sets in terms of reaction time.

*Exploratory Analyses*

The following exploratory analyses were conducted to further examine the failure to find support for the primary hypotheses.

*Number of Errors.* At the outset of the study, the researcher acknowledged the possibility that our dot-probe task might be sensitive to participant impulsivity. Participants were instructed to press either the “1” or “2” key as quickly as possible after they detected the presence of the dot-probe. If participants did not press the key immediately, the resulting reaction time would not be an accurate representation of AB. In addition, participants were instructed to use the same finger to press either key throughout the task (i.e., if they used the pointer finger to press “1,” they must use the same finger to press “2,” or vice versa), ruling out the possibility that using different fingers to press the keys might create slight differences in reaction time. Nonetheless, due to possible participant impulsivity, and the fact that the “1” and “2” keys are in such close proximity to one another on the keyboard, the investigator realized the high potential for error during the task.

Therefore, the researcher examined the number of errors each participant made during the dot-probe task according to speech anxiety group. A response was defined as an error if the participant pressed the “1” key when the probe replaced the bottom word (rather than pressing “2,” as instructed), or if the participant pressed the “2” key when the probe replaced the top word (rather than pressing “1,” as instructed). A univariate ANOVA was conducted, which revealed that the low speech anxiety group made a mean of 3.00 errors ($SD = 2.42$), while the high speech anxiety group made a mean of 2.77 errors ($SD = 2.73$). Thus, the difference between the two group means was not significant, suggesting that both groups were equally likely to make the same number of errors during the task.
The investigator also examined the number of errors made in the first set of 64 trials during the task, as compared to the second set of 64 trials. This analysis was conducted in order to determine if a practice effect existed for the dot-probe task. In other words, the researcher wanted to know if participants were significantly more likely to make errors during the first half of the task, and significantly less likely to make errors during the second half of the task (after they had become accustomed to it). A univariate ANOVA revealed that the mean number of errors made in trials 1 – 64 was 1.51 (SD = 1.91), and the mean number of errors made in trials 65 – 128 was 1.39 (SD = 1.33). These values did not significantly differ, implying that participants were no more likely to make errors during the first half of the task than they were during the second half of the task. The number of total errors made by participants ranged from 0 (n = 10) to 10 (n = 1). Therefore, most participants (n = 51) made at least one error during the entire task, but 43 individuals (71%) made three errors or fewer (out of 128 trials).

Social Phobia. Because other studies (e.g., Mansell, Clark, & Ehlers, 2003) have detected an AB toward threat in individuals with diagnosable social phobia, the investigator conducted an exploratory 2 x 5 repeated measures ANOVA in which the five different word types served as the within-subjects variable and social phobia diagnosis served as the between-subjects factor. Results indicated that social phobics had faster reaction times in all five word domains, as compared to participants without social phobia (as shown in Table 8); however, this effect failed to reach significance. Moreover, the researcher did not detect a significant interaction between word type and social phobia diagnosis. Because the social phobia group in the present study only contained three participants, however, these analyses are underpowered and preliminary in nature.

Trait Anxiety Level. In light of previous studies (e.g., MacLeod, Mathews, & Tata, 1986) that have detected the presence of an AB toward threat in a GAD sample, the researcher conducted an exploratory analysis in which high trait anxiety was substituted for high speech anxiety. To do this, the investigator performed a median split for laboratory STAI-T scores, and obtained a median score of 37 for the overall sample of 61 participants. Participants were grouped into two categories: group 1 (low trait anxious individuals; n = 30), who scored 36 or below on the laboratory-administered STAI-T, and group 2 (high trait anxious individuals; n = 31), who scored 37 or higher on the STAI-T.
A 2 x 5 repeated measures ANOVA revealed a significant interaction between word type and trait anxiety group, $F(4,236) = 4.95, p < .001$. Table 9 presents the reaction times to the five word types (neutral2, negative2, somatic, social, and physical) as a function of trait anxiety group. The most pronounced difference in reaction time appears to be in the negative evaluation word category; according to a univariate ANOVA, high trait worriers responded more quickly than low trait worriers at a trend level ($p < .10$). In all other threat word categories, as well as in the neutral2 category, nonsignificant differences were found between the two groups in reaction time.

Additionally, reaction times to the four types of threat words and neutral words were examined within each trait anxiety group. Within the high trait anxiety group, no significant differences in reaction time to the five word types existed. However, a different pattern emerged when the low trait anxiety group was investigated. In this analysis, there was a significant main effect for word type ($F[4,116] = 3.74, p < .01$). Specifically, there were significant differences between reaction times to negative2 words and several other word types: neutral2, physical threat, and somatic words ($p = .03, .03, and .04$, respectively). Low trait worriers responded significantly slower to negative2 words as compared to neutral2, physical threat, and somatic words.

**DISCUSSION**

*Primary Aims*

The primary goal of the present study was to evaluate whether speech anxious individuals had an AB to threat stimuli. This objective was examined by determining if a significant difference existed in the reaction times of high and low speech anxious participants to threatening and neutral stimuli in a dot-probe AB task. It was predicted that, compared to the low speech anxiety group, the high speech anxiety group would show faster reaction times when the dot-probe replaced threatening words, as opposed to neutral words. Participants with public speaking anxiety were expected to attend to such threatening stimuli, and thus, these participants would more quickly detect when threat words were replaced by a dot-probe, as compared to low speech anxious participants.
Assessment Scores and Correlations

When each of the three anxiety assessments were examined (PRPSA, PSWQ, and STAI-T), significant correlations were found between the online and laboratory administrations. These significant correlations suggest that participants were likely to obtain similar scores on their initial completion of each assessment (the online administration) and the laboratory administration of each assessment at a later date. Therefore, one may conclude that participants in the current study completed the three anxiety self-report measures reliably. The two speech anxiety groups also significantly differed in their online PRPSA, PSWQ, and STAI-T scores, indicating that, even when taken online, these measures can accurately distinguish high and low anxious individuals in terms of public speaking anxiety, general worry, and trait anxiety.

As expected, the two speech anxiety groups displayed significant differences between their mean PRPSA scores in the laboratory, indicating that participants who were selected for participation based on this measure continued to differ at the time of the lab study. Further, the two speech anxiety groups also differed on a measure of generalized anxiety and a measure of trait anxiety. Such differences indicate that not only did the two groups significantly differ in terms of speech anxiety, but they also significantly differed in terms of general, trait-level anxiety and general worry. Specifically, the low speech anxiety group was more likely than the high speech anxiety group to score low on measures related to trait worry and general anxiety. Individuals who experience anxiety about speaking in public, therefore, are also likely to worry and experience anxiety in other, more general domains.

Public Speaking Anxiety and Social Phobia

The percentage of high speech anxiety participants meeting criteria for social phobia in the present study (10%) suggests that social anxiety and public speaking anxiety can co-exist, but at the same time, do not co-occur with a high frequency (i.e., 90% of participants in the high speech anxiety group did not have social phobia). During the ADIS-IV, many participants in the high speech anxiety group endorsed a strong and persistent fear of “talking in front of a group/formal speaking,” but this anxiety did not necessarily translate to other social domains assessed by the ADIS-IV (e.g., parties, speaking with unfamiliar people, initiating and
maintaining conversations). Previous research has indicated that an AB for social threat stimuli may exist in individuals with diagnosable generalized social phobia (e.g., Mansell, Clark, & Ehlers, 2003), but the present study suggests that such a bias does not apply to threatening stimuli related to public speaking anxiety (e.g., negative evaluation words and social words related to public speaking).

Comparison of Anxiety Ratings

A manipulation check was conducted to ensure that the speech anxiety groups differed in the amount of anxiety they experienced as a result of being informed of the 3-minute speech task, and therefore effectively primed the anxiety of the high speech anxiety group before they participated in the dot-probe task. Ononaiye, Turpin, and Reidy (2007) did not find an AB between threat word stimuli specific to speech anxiety in high versus low, non-clinical, socially-anxious individuals. These researchers may have failed to find a group difference specific to social threat stimuli because participants’ social anxiety was not sufficiently primed prior to the dot-probe task. As in the current study, Ononaiye, Turpin, and Reidy used a subclinical (i.e., not diagnosed) sample of participants. Results from the present study indicate that priming does not enhance the AB effect when individuals are not at a diagnosable level of anxiety. Thus, it is possible that the current study did not detect significant differences in AB between the high and low speech anxiety groups because public speaking anxiety is not a diagnosable phenomenon, and most participants in the high speech anxiety group did not meet criteria for a clinical diagnosis of social phobia.

At the same time, diagnosis itself may not be responsible for producing an AB; instead, diagnosis may represent a separate, but related phenomenon that is responsible for the AB effect. For instance, the knowledge that one has of meeting diagnostic criteria for a specific disorder (e.g., social phobia), rather than the diagnosis of the disorder itself, could serve as a potential mediating factor between anxiety and AB toward threat. Moreover, because public speaking anxiety is so common in American society (as compared to social phobia), it is arguable that less stigma is attached to public speaking anxiety, in comparison to other, diagnosable anxiety problems. It is possible that speech anxious individuals possess the belief that their type of anxiety is somewhat universal (i.e., many people have experienced some degree of anxiety as a
result of speaking in front of a group), in comparison to individuals with social phobia, who may feel “abnormal” as a result of their diagnosis. In sum, perhaps the level of stigma associated with one’s anxiety problem and/or formal diagnosis is at least partially responsible for producing an AB toward threat, rather than diagnosis itself.

The present study did employ a prime for anxiety by informing participants that they would deliver a 3-minute speech during the lab session. According to subsequent subjective anxiety ratings, this prime worked effectively. As previously reported, participants were asked to rate their anxiety three separate times throughout the lab session. The first rating served as a baseline rating; the second rating was obtained immediately following the 3-minute speech prime. The third anxiety rating was collected after the participant delivered his or her speech.

The high and low speech anxiety groups displayed significant differences in terms of their subjective anxiety ratings at all three time points, such that the high speech anxiety group had significantly higher ratings of anxiety than the low speech anxiety group. Moreover, when the baseline anxiety ratings were compared to the anxiety ratings at time 2 (immediately following the 3-minute speech prompt), the high speech anxiety group showed a significant increase from baseline in their anxiety ratings. In contrast, the time 2 anxiety ratings of the low speech anxiety group remained relatively similar to baseline ratings.

These results indicate that the 3-minute speech prompt did – as intended – create anxiety in the high speech anxiety group, in comparison to the low speech anxiety group. However, despite these significant differences in subjective anxiety ratings, the different levels of self-reported anxiety as a result of the 3-minute speech prompt did not translate to an increased AB to threat stimuli. Therefore, one cannot conclude that the failure to detect significant findings in reaction times by group during the dot-probe task resulted from a lack of anxiety priming.

Comparison of Threat Word Ratings

The possibility exists that significant differences were not detected in reaction times to threatening versus neutral words in the high and low speech anxiety groups because the participants did not find the words threatening to begin with. This potential confound was examined by comparing the two speech anxiety groups on their threat ratings for the threatening words. These subjective ratings of threat were compared between groups. We found a
significant interaction between threat word type and speech anxiety group, indicating that individuals in the high speech anxiety group rated these words as significantly more threatening than individuals in the low speech anxiety group. It is likely, therefore, that the stimulus words produced a sufficient level of threat to elicit an AB if one exists in these individuals.

*Number of Errors*

As previously noted, most participants made at least one error during the dot-probe task, but more than 70% of the sample made three errors or fewer (out of 128 trials). Therefore, even though most participants made at least one error during the dot-probe task, the majority of participants did not make errors continuously throughout the experiment (doing so might have suggested impulsivity or random responding). The present study’s findings suggest that the task may have been sensitive to impulsivity for a small minority of participants, but most participants did not display impulsive or random responding while completing the dot-probe paradigm. Impulsivity may partially explain why some participants made more errors than others, but relatively few participants could be classified as highly error-prone. It is possible that, among participants who were highly error-prone, the dot-probe task is not as valid of a measure of AB, in comparison to individuals who made fewer errors.

*Social Phobia*

As previously reported, in the current sample of 61 participants, three individuals met criteria for diagnosable social phobia. Therefore, even among the high speech anxiety group, most participants did not meet criteria for a generalized diagnosis of social anxiety disorder. Such a finding indicates that the majority of participants in the high speech anxiety group displayed performance fears that were discrete and specific to public speaking situations only. Nonetheless, because other studies (e.g., Mansell, Clark, & Ehlers, 2003) have detected an AB toward threat in individuals with diagnosable social phobia, the researcher conducted an exploratory 2 x 5 repeated measures ANOVA to test for an interaction between social phobia group and word type.

Results indicated that social phobics had faster reaction times in all five word domains, as compared to participants without social phobia (as shown in Table 8); however, this effect failed
to reach significance. Moreover, the investigator did not detect a significant interaction between word type and social phobia diagnosis. However, this exploratory analysis was highly underpowered, as the sample contained only three social phobics out of 61 total participants. Future research may wish to address the question of whether an AB for threat stimuli related to public speaking exists in speech anxious individuals who are also social phobics, as compared to individuals with public speaking anxiety only, using a larger number of participants meeting criteria for social phobia.

Trait Anxiety Level

Prior research (e.g., MacLeod, Mathews, & Tata, 1986) has detected the presence of an AB toward threat in a GAD sample. As a result, the researcher conducted an exploratory analysis in which high trait worry (according to the STAI-T) was substituted for high speech anxiety. The investigator detected a significant interaction between word type and trait anxiety group. However, in all word categories (including threat word categories), nonsignificant differences were found between the two groups in reaction time. The investigator did nonetheless find a statistical trend in the following direction: high trait anxious individuals tended to respond to negative evaluation words more quickly than low trait anxious individuals.

Additionally, the reaction times to the four threat word types plus neutral words were examined within each trait anxiety group. While no significant differences in reaction times were found within the high trait anxiety group, the researcher did detect significant differences in reaction times within the low trait anxiety group. In particular, low trait anxious individuals responded significantly slower to negative2 words than somatic words, physical words, and neutral2 words (despite that the category of negative words tested only encompassed trials 65 – 80 of the experiment, while excluding trials 1 – 16). This significant within-group difference may partially explain why a significant interaction between word type and trait anxiety group was obtained.

It remains unclear why the specificity hypothesis did not hold when participants were analyzed according to their speech anxiety group, rather than their trait anxiety level. In the 2 x 5 repeated measures ANOVA in which speech anxiety group was taken into account, there were no reaction time differences between the two groups in any word category. Such a finding
provides further evidence that AB differences between anxiety groups may not apply to the specific construct of public speaking anxiety. Instead, evidence for an AB toward threat may only exist when more generalized types of anxiety are examined (e.g., MacLeod, Mathews, & Tata, 1986), or generalized social phobia is examined (e.g., Spector, Pecknold, & Libman, 2003; Mansell, Clark, & Ehlers, 2003). Unlike GAD and social phobia, public speaking anxiety represents a very discrete and precise type of fear. Such fears may not be readily amenable to studies that examine AB due to their extremely specific and situational nature. Future research might address whether reaction time differences exist between individuals with public speaking anxiety and generalized anxiety, as opposed to individuals with public speaking anxiety only.

Limitations

Dot-Probe Task Design. After all 61 participants had taken part in the dot-probe task, it was recognized that an error existed in the design of the dot-probe task. In this task, one word actually appeared on the screen longer than 500 ms. That is, when the word replaced by the dot disappeared from the screen after its initial presentation, the accompanying word stayed on the screen. That word remained on the screen during the word-to-dot transition; it also remained on the screen when the dot appeared. Hence, reaction times (and therefore, AB) may have been affected. It is conceivable that participants were not processing the actual words, but were simply responding to the sudden presence of a dot that was not on the screen before. Such a response would preclude any processing of the words displayed on screen that may have otherwise led to an AB.

Lack of Practice and Filler Trials. Unlike other dot-probe paradigms that have been used in previously summarized research studies, the present study did not employ practice trials at the beginning of the experiment to familiarize participants with the program interface. Doing so might have eliminated the comparatively slow reaction times that were detected for negative evaluation and neutral words at the beginning of the experiment (i.e., trials 1 – 16). Such trials were subsequently eliminated from analyses due to their significantly longer reaction times, as compared to later trials. However, if the current study had employed practice trials, eliminating the first 16 trials of the experiment for subsequent analyses may not have been necessary. Also, if a sufficient number of practice trials had been utilized, there may not have been a significant
difference in reaction times during trial set 1 (trials 17 – 32) and trial set 2 (trials 81 – 96) for somatic words. It is plausible that participants took longer than the first 16 trials to acclimate to the dot-probe experiment, explaining the longer reaction times for trial set 1 (as compared to trial set 2), even in the somatic word category (which appeared after the negative word category).

Moreover, the present study did not employ “filler” trials in which a neutral word was paired with another neutral word. Rather, in all 128 trials, a threat word was paired with a neutral word. “Filler” trials are typically used so that participants do not begin to detect the purpose of the experiment. Because the current study did not employ “filler” trials, it is possible that participants began to detect the purpose of the experiment over time. Hence, the reaction times of these participants may have been affected. At the same time, one would expect reaction times to be impacted uniformly across both groups, so this experimental modification may be unnecessary in this particular study.

Type of Stimuli Used. As noted previously, researchers have used two types of stimuli to measure AB in a dot-probe format: facial stimuli and word stimuli. Participants with anxiety that is more externally-focused, as opposed to internally-focused, may respond differently to a dot-probe task that utilizes faces, as opposed to a dot-probe task that utilizes words. The investigator expected that public speaking anxiety would represent an excessive internal focus, rather than external focus. Due to the similarities between social phobia and public speaking anxiety, the researcher believed that, consistent with a study by Mansell, Clark, and Ehlers (2003) in social phobics, speech anxious participants would display an increased self-focus during times of threat. As a result, it was anticipated that comparing reaction times to threatening versus neutral words would serve as an adequate method of measuring this internally-focused bias. In contrast, it is conceivable that participants with externally-focused anxiety (i.e., an excessive focus on others, rather than the self) might show a greater AB to threatening versus neutral faces, rather than words. The present study did use some externally-focused words (e.g., audience) in the dot-probe task, but perhaps not enough of these words existed in the experimental paradigm to prime the external bias of high speech anxious individuals.

It is possible that public speaking anxiety does not represent an internally-focused type of anxiety as the researcher originally believed. Perhaps individuals with public speaking anxiety are concerned about being judged negatively by others, and in turn, they tend to focus excessively on other people during times of threat (e.g., giving a speech). Indeed, during the
ADIS-IV portion of the current study, when individuals were asked to list their specific concerns about public speaking, many people relayed a concern of being judged or perceived negatively by other individuals as the primary reason that they fear giving speeches. Future research might employ a dot-probe AB task in which threatening and neutral faces are used, instead of or in addition to threatening and neutral words. It is possible that individuals with discrete public speaking anxiety (rather than generalized social phobia) will display a greater focus on others, rather than the self, and consequently, will show an AB toward threat when faces are used.

**Lack of Public Speaking-Related Stimuli.** It is possible that the current study failed to find an AB effect because the threat words did not adequately focus on public speaking itself. Indeed, much of the focus in the social word category was on social situations unrelated to speaking in public (e.g., meeting, interview, conversation). The social word category did contain some words related to public speaking (e.g., public, speech, audience), but more of these words may have been needed in order to detect an AB. Such a limitation could be explored in future research in which additional public speaking-related stimuli are included in a dot-probe paradigm.

**Lack of Neutral Word Ratings.** While all participants subjectively rated the 64 threat words according to threat level produced, participants did not rate neutral words. Doing so would have ensured that individuals did not display an idiosyncratic bias toward any of the words in the neutral category. While the neutral words may have been nonthreatening to the researchers that created them, it is conceivable that even some of the neutral words would have produced an anxious response in some participants. A significant subjective anxiety rating for any of the neutral words could have produced an AB toward such neutral words in the dot-probe task, negating any bias that would have been detected for threat words.

**Use of Online Questionnaires.** Another potential weakness of the present study is that the experimenter used online questionnaires to assess public speaking anxiety levels and resulting group membership in the laboratory task. As previously noted, online data may be less reliable than laboratory data – the primary reason for using laboratory PRPSA, PSWQ, and STAI-T scores in the analyses of the primary hypotheses. Participants can complete an online questionnaire at a time and in a location of their choosing, and therefore, their anxiety may not be sufficiently primed during the online questionnaire. As a consequence, the resulting score from an online assessment may be somewhat inaccurate. In contrast, laboratory assessments
may reflect participants’ anxiety levels more precisely, as individuals are completing the questionnaires in the experimental situation. This possibility was accounted for in the present study by repeating the online-administered measures a second time in the laboratory.

Moreover, significant positive correlations existed between the online and lab administrations for each of the three anxiety measures (PRPSA, PSWQ, and STAI-T). As a possible future research project, one might systematically compare the results of assessments administered online versus in person using a variety of reliability and validity indices. The results of such a project may contain important implications regarding the utility and reliability of online questionnaires.

*Reliance on Self-Report Data.* In the current study, participants completed three self-report measures of anxiety: the PRPSA, the PSWQ, and STAI-T. In addition, participants were asked to rate their own anxiety levels during the lab portion of the study on three separate occasions. Although the experimenter watched as the participants delivered their speeches, the researcher did not rate the participants’ anxiety levels, nor were any other observer report measures obtained. Future research may wish to corroborate participants’ self-reported public speaking anxiety with observer measures (e.g., researcher ratings of participant anxiety).

*Gender Composition.* As previously noted, the sample of the current study contained more females than males (in both speech anxiety groups). The present study contained 40 females and 21 males. While females were not more likely to be in the high or low speech anxiety groups as compared to males, females were more likely to participate in the study in general. The reason for greater female participation, as compared to male participation, is unclear, but two possibilities exist. First, it is possible that females are more likely to be enrolled in psychology courses at Virginia Tech, and therefore are more likely to participate in extra credit research studies in the department. Alternatively, the gender difference in overall participation may reflect a motivational difference: females may simply be more motivated to report to the laboratory for extra credit than males.

**CONCLUSION**

In sum, the present study examined the link between threatening stimuli and AB in college students with high and low levels of public speaking anxiety. The researcher measured
this AB using a dot-probe task with threatening and neutral words. It was expected that students in the high speech anxiety group would show a significant AB (i.e., a faster reaction time) to threatening words, as compared to the low speech anxiety group. The primary hypothesis was not supported; the two speech anxiety groups did not show reaction time differences to threat words in general.

It was further anticipated that the high speech anxiety group would show a stronger AB for certain types of threatening words (i.e., words relevant to the specific nature of the anxiety—namely, somatic words, negative evaluation words, and social words). The investigator did not find evidence of differing reaction times to specific types of threat words in the high speech anxiety group. Therefore, when public speaking anxiety group was examined, the specificity hypothesis failed to demonstrate significance in this particular sample.

However, when participants were grouped according to trait anxiety level (rather than public speaking anxiety level) in an exploratory analysis, the researcher did detect some evidence in support of the specificity hypothesis. However, this evidence was detected only at the statistical trend level. Specifically, at the trend level, high trait worriers responded more quickly to negative evaluation words, as compared to low trait worriers. From this preliminary finding, one might surmise that negative evaluation words represent the fear of public speaking most accurately, as compared to other threat word types (the reason for the reaction time differences at the trend level).

When searching for possible explanations as to why the two speech anxiety groups did not differ in their reaction times to threat words, and why the high speech anxiety group did not demonstrate an AB toward threat as a result, several confounds may be ruled out due to the manipulation checks employed in our experiment. First, one might argue that individuals were not sufficiently primed before participating in the dot-probe task, and thus, did not show differences in reaction time. However, our study did prime participants before they engaged in the dot-probe task by informing them of an upcoming 3-minute speech that they would deliver later in the session. Additionally, evidence suggests that this prime operated in its intended fashion. That is, when subjective anxiety ratings were compared by speech anxiety group following this 3-minute speech prompt, significant differences were detected. In particular, high speech anxiety participants rated their own anxiety significantly higher than those in the low speech anxiety group. Another explanation that may be ruled out is that participants in the two
groups did not find the words differentially threatening to begin with. According to subjective ratings, the two speech anxiety groups displayed significant differences in how anxiety-provoking they believed each of the threat words to be.

Therefore, the reader is left with two theories as to why the current study failed to detect significant effects in terms of AB toward threat. First, it is possible that an AB toward threat does not exist in public speaking anxiety, even though such a bias has been demonstrated in other anxiety disorders (e.g., GAD, social phobia). Public speaking anxiety may inherently differ from GAD and social phobia due to its discrete and situational nature. As a result of the differences between speech anxiety and other anxiety problems, an AB toward threat may not be detectable in a condition as distinct as public speaking anxiety. Second, it is possible that the study failed to detect an AB toward threat in speech anxious participants simply because the incorrect type of stimuli was used in the dot-probe task. The current study employed threatening and neutral words, rather than threatening and neutral faces, with the assumption that public speaking anxiety represented a comparatively self-focused, as opposed to other-focused, type of anxiety. This assumption may have been inaccurate, however, and therefore, future research may wish to examine AB toward threat in speech anxious individuals using stimuli that is more externally-focused (e.g., faces).
REFERENCES


Table 1

*Gender Composition of Each Speech Anxiety Group*

<table>
<thead>
<tr>
<th>Speech Anxiety Group</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>12 (39%)</td>
<td>19 (61%)</td>
<td>31 (51%)</td>
</tr>
<tr>
<td>High</td>
<td>9 (30%)</td>
<td>21 (70%)</td>
<td>30 (49%)</td>
</tr>
<tr>
<td>Total</td>
<td>21 (34%)</td>
<td>40 (66%)</td>
<td>61</td>
</tr>
</tbody>
</table>
Table 2

*Mean Subjective Anxiety Ratings by Speech Anxiety Group*

<table>
<thead>
<tr>
<th>Speech Anxiety Group</th>
<th>Rating 1 Mean (SD)</th>
<th>Rating 2 Mean (SD)</th>
<th>Rating 3 Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1.87 (1.41)</td>
<td>2.48 (1.61)</td>
<td>2.61 (2.22)</td>
</tr>
<tr>
<td>High</td>
<td>4.17 (1.95)</td>
<td>6.03 (2.03)</td>
<td>6.20 (2.34)</td>
</tr>
<tr>
<td>(F)</td>
<td>27.94</td>
<td>57.61</td>
<td>37.81</td>
</tr>
<tr>
<td>(p)</td>
<td>&lt; .001</td>
<td>&lt; .001</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>
Table 3

*Mean Subjective Word Ratings by Speech Anxiety Group*

<table>
<thead>
<tr>
<th>Threat Word Type</th>
<th>Low Speech Anxiety Mean (SD)</th>
<th>High Speech Anxiety Mean (SD)</th>
<th>$F$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>4.15 (.39)</td>
<td>5.62 (.40)</td>
<td>6.97</td>
<td>.01</td>
</tr>
<tr>
<td>Somatic</td>
<td>2.62 (2.02)</td>
<td>3.64 (1.72)</td>
<td>4.54</td>
<td>.04</td>
</tr>
<tr>
<td>Social</td>
<td>1.78 (1.35)</td>
<td>4.50 (1.85)</td>
<td>43.32</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Physical</td>
<td>4.00 (2.72)</td>
<td>5.39 (2.22)</td>
<td>4.76</td>
<td>.03</td>
</tr>
</tbody>
</table>
Table 4

*Mean Reaction Times (RT) to Threat and Neutral Words by Speech Anxiety Group*

<table>
<thead>
<tr>
<th>Word Type</th>
<th>Low Speech Anxiety Mean RT (SD)</th>
<th>High Speech Anxiety Mean RT (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>423.61 (60.58)</td>
<td>437.64 (66.25)</td>
</tr>
<tr>
<td>Threat</td>
<td>426.15 (58.72)</td>
<td>446.63 (76.59)</td>
</tr>
</tbody>
</table>
Table 5

*Comparison of Reaction Times by Negative Variable*

<table>
<thead>
<tr>
<th>Negative Variable</th>
<th>Reaction Time Mean (SD)</th>
<th>$F$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>476.09 (124.27)</td>
<td>12.98</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Negative2</td>
<td>435.02 (99.80)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6

*Comparison of Reaction Times by Neutral Variable*

<table>
<thead>
<tr>
<th>Neutral Variable</th>
<th>Reaction Time Mean (SD)</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>430.51 (63.30)</td>
<td>55.94</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Neutral2</td>
<td>424.00 (62.93)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7

*Word Type Reaction Times by Speech Anxiety Group*

<table>
<thead>
<tr>
<th>Word Type</th>
<th>Speech Anxiety Group</th>
<th>Reaction Time Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral2</td>
<td>Low</td>
<td>416.22 (59.04)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>432.03 (66.76)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>424.00 (62.93)</td>
</tr>
<tr>
<td>Negative2</td>
<td>Low</td>
<td>425.26 (83.46)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>445.11 (114.87)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>435.02 (99.80)</td>
</tr>
<tr>
<td>Somatic</td>
<td>Low</td>
<td>420.56 (72.54)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>435.31 (70.08)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>427.81 (71.13)</td>
</tr>
<tr>
<td>Social</td>
<td>Low</td>
<td>414.46 (62.28)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>427.93 (58.42)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>421.08 (60.29)</td>
</tr>
<tr>
<td>Physical</td>
<td>Low</td>
<td>412.12 (50.16)</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>433.41 (88.06)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>422.59 (71.56)</td>
</tr>
</tbody>
</table>
Table 8

*Word Type Reaction Times (RT) by Social Phobia Group*

<table>
<thead>
<tr>
<th>Word Type</th>
<th>Social Phobia Mean RT (SD)</th>
<th>Non-Social Phobia Mean RT (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral2</td>
<td>380.03 (34.78)</td>
<td>426.27 (63.40)</td>
</tr>
<tr>
<td>Negative2</td>
<td>358.28 (20.26)</td>
<td>438.99 (100.72)</td>
</tr>
<tr>
<td>Somatic</td>
<td>364.08 (24.79)</td>
<td>431.11 (17.27)</td>
</tr>
<tr>
<td>Social</td>
<td>361.76 (28.18)</td>
<td>424.15 (60.29)</td>
</tr>
<tr>
<td>Physical</td>
<td>348.40 (19.29)</td>
<td>426.43 (71.22)</td>
</tr>
</tbody>
</table>
Table 9

*Word Type Reaction Times (RT) by Trait Worry Group*

<table>
<thead>
<tr>
<th>Word Type</th>
<th>Low Trait Worry Mean RT (SD)</th>
<th>High Trait Worry Mean RT (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral2</td>
<td>422.04 (65.43)</td>
<td>425.90 (61.44)</td>
</tr>
<tr>
<td>Negative2</td>
<td>456.45 (124.13)</td>
<td>414.28 (64.20)</td>
</tr>
<tr>
<td>Somatic</td>
<td>422.57 (80.35)</td>
<td>432.88 (61.84)</td>
</tr>
<tr>
<td>Social</td>
<td>419.97 (63.29)</td>
<td>422.17 (58.27)</td>
</tr>
<tr>
<td>Physical</td>
<td>412.46 (54.05)</td>
<td>432.40 (84.94)</td>
</tr>
</tbody>
</table>
APPENDICES

Appendix A

INFORMED CONSENT FORM

(Assessment and Laboratory Portions)

Study Title: Do College Students with Public Speaking Anxiety Show an Attentional Bias Toward Threat?

Investigators: George Clum, Ph.D. and Kristen Frey, B.S.

I. Purpose of this Project:

The purpose of this project is to examine the attentional biases of individuals with high and low levels of public speaking anxiety.

II. Procedures

I am being asked to help the above researchers in a project. In the initial portion of this study, I will complete an online questionnaire about public speaking anxiety. I will also answer questions online related to worry and anxiety in general. In the laboratory portion of the study, I will answer some questions regarding my physical and mental health history. I will complete the same questionnaires I completed in Part I regarding public speaking anxiety and general anxiety. Moreover, I will participate in a semi-structured interview with a researcher in which I will be asked questions about social anxiety. This semi-structured interview will take approximately 10 to 15 minutes.

After completing these assessments, I will be asked to participate in a laboratory task. Participants with both high levels of public speaking anxiety and low levels of public speaking anxiety are needed for this laboratory tasks. During the laboratory session, I will participate in a computer-based task measuring attention. This task will last approximately 5 minutes. After participating in the computer task, I will be instructed to give a 3-minute speech on a topic of my choice. I will be allotted 3 minutes to prepare my speech before I deliver it. Preparing and delivering my speech will last about 10 minutes or less.
If I decide to participate, the questionnaire and interview (i.e., assessment) portion of this study will last less than 1 hour. The second part of my participation – the laboratory tasks, which include the two computerized attention tasks and the speech task – will likely last about 1 hour or less. Participation in the second portion of the study (laboratory tasks) is optional for increased extra credit amounts and will in no way impact the extra credit received during the assessment portion.

In addition to receiving extra credit, if I meet criteria to participate in Part II of the study, I will be entered into three separate drawings for three separate gift cards to a local merchant. My study ID number, rather than my name, will be entered into a hat for the first drawing, as well as subsequent drawings if I do not win the first drawing. One gift card will be worth $20, one gift card will be worth $30, and the third gift card will be worth $50. As part of the drawings, my study ID number will be placed in a hat with the study ID numbers of other Part II participants, and one study ID number will be drawn at random by the researcher. I understand that if I am selected as a winner for one of the gift cards, I will be removed from subsequent gift card drawings. Therefore, it is not possible for me to win multiple gift cards.

III. Risks

There may be some emotional and physical discomfort for me as a participant throughout the study. Filling out anxiety-related questionnaires and answering interview questions regarding anxiety may serve as emotional stressors. Also, I will be asked to give a 3-minute speech on a topic of my choice during the laboratory portion of the study. This 3-minute speech may be physically and emotionally distressful for some individuals. I may experience physical symptoms of anxiety (e.g., heart rate increase, sweating) during the speech task, as well as during the preparatory phase, if I am prone to feeling fearful about public speaking. Further, I will be completing a brief task on the computer during the laboratory portion of the study, which will take approximately 5 minutes. I may experience mild eye strain as a result of looking at a computer screen. If I feel particularly distressed by these tasks at any time, the researchers will assist me in contacting either the Cook Counseling Center (231-6557) or the Psychological Services Center (231-6914).

IV. Benefits of This Project
There is a societal benefit of understanding the causes and contributors of public speaking anxiety. It is important to understand the causes and maintenance of public speaking anxiety so that effective interventions may be developed to treat it. However, I understand that the current study in which I am being asked to participate is not a treatment study for public speaking anxiety. Another potential benefit of the current study is an increase in knowledge regarding the specific types of stimuli that are particularly threatening to speech anxious individuals.

V. Confidentiality

All of my responses will be completely confidential. I will provide my e-mail address for two purposes only. First, my e-mail address will be used for the purpose of receiving academic course credit, but not in relation to my particular set of questionnaires. A code number will be assigned to my assessment instruments and only this number will be associated with the data. Second, my e-mail address will be used for the research team to contact me in regard to scheduling my lab session. At no time will the researchers release personally identifying information from this study to anyone other than the individuals working on the project without my written consent.

VI. Compensation

Introductory Psychology undergraduates will receive extra credit points averaged into their final grade, with one extra credit point for every hour or part of an hour of participation. Undergraduates in other courses may receive extra credit as determined by their course instructor. Completion of the assessment portion of this study is worth one extra credit point. The completion of the laboratory portion of this study is worth one additional extra credit point.

VII. Freedom to Withdraw

This project has been explained to me and I have been permitted to ask questions about the project, as well as my duties and responsibilities. I understand that I am not required to fill out the questionnaires or participate in any way if I do not want to, and that there are no negative consequences for withdrawal. I can stop midway through or withdraw at any time if I choose. If I decide to withdraw, I understand that extra credit will be prorated based on my length of
participation in the study, where one credit is awarded for each hour or part of an hour of
participation. I also understand that, per University and Department of Psychology policy, my
course instructor can provide me with other opportunities for extra credit.

VIII. Approval of Research

This research project has been approved, as required, by the Institutional Review Board
for Research Involving Human Subjects of Virginia Polytechnic Institute and State University,
and by the Department of Psychology.

IX. Participant’s Responsibility

I am responsible for filling out a questionnaire on public speaking anxiety and general
anxiety, as well as completing a semi-structured interview on social anxiety. I also agree to
answer a series of questions regarding my physical and mental health history. I will complete
the public speaking questionnaire on SONA, and I will complete the semi-structured interview
and answer questions about my health history in the lab. The assessment portion of this project
will take less than 1 hour. During the laboratory portion, I am expected to make my best attempt
at the tasks I will be asked to complete. I will be asked to complete a task on the computer that
measures attention; the task will last about 5 minutes. Further, I will be asked to deliver a 3-
minute speech on a topic of my choice, and I will be given 3 minutes of preparatory time. I will
attempt to complete the tasks as directed to the best of my ability. I expect the laboratory portion
to last about 1 hour or less.

X. Participant’s Permission

I have read and understood the Informed Consent Form and conditions of this project. I
have had all my questions answered. I hereby acknowledge the above and give my voluntary
consent for participation in this project.

If I participate, I may withdraw at any time without penalty. I agree to abide by the rules
of this project.

Participant ___________________________ Date __________
Should I have any questions about this research or its conduct, I may contact:

Dr. George Clum  
Principal Investigator  
phone: 231-5701  
gclum@vt.edu

Kristen Frey  
Co-Investigator  
kfknapp@vt.edu

Dr. David Moore  
Chair, IRB  
CVM Phase II  
phone: 231-4991

Dr. David Harrison  
Chair, Psychology Human Subjects Committee  
dwh@vt.edu  
phone: 231-4422
Appendix B

Health History Questionnaire

A very brief medical history must be obtained as part of the experimental protocol. It is very important that you be completely honest. This information will be kept strictly confidential.

1. What is your age, height, weight, and gender?
   Age: _____ years
   Height: _____ feet, _____ inches
   Weight: _____ pounds
   Sex: ___M ___F

2. Since birth, have you ever been hospitalized or had any major medical problems?
   ___ Yes ___ No
   If Yes, briefly explain:

3. Have you ever experienced a concussion or lost consciousness due to a blow to the head?
   ___ Yes ___ No
   If Yes, briefly explain:

4. Have you ever had problems that required you to see a counselor, psychologist, or psychiatrist?
   ___ Yes ___ No
   If Yes, briefly explain:
5. Do you use tobacco products of any kind?
___ Yes ___ No
If Yes, describe what kind how often/much:

6. Have you ever been diagnosed with a psychological disorder?
___ Yes ___ No
If Yes, briefly explain:

7. Do you currently have or have you ever had any of the following?
___ Yes ___ No Strong reaction to cold weather
___ Yes ___ No Circulatory problems
___ Yes ___ No Tissue disease
___ Yes ___ No Skin disorders (other than facial acne)
___ Yes ___ No Arthritis
___ Yes ___ No Asthma
___ Yes ___ No Lung problems
___ Yes ___ No Cardiovascular disorder/disease
___ Yes ___ No Diabetes
___ Yes ___ No Hypoglycemia
___ Yes ___ No Hypertension (high blood pressure)
___ Yes ___ No Hypotension (low blood pressure)
___ Yes ___ No Hepatitis
___ Yes ___ No Neurological problems
___ Yes ___ No Epilepsy or seizures
___ Yes ___ No Brain disorder
___ Yes ___ No Stroke
If you responded Yes to any of the above conditions, briefly explain:

8. Have you ever been diagnosed as having:
   ___ Yes ___ No  Learning deficiency or disorder
   ___ Yes ___ No  Reading deficiency or disorder
   ___ Yes ___ No  Attention deficit disorder
   ___ Yes ___ No  Attention deficit hyperactivity disorder;

9. Do you have:
   ___ Yes ___ No  Claustrophobia (extreme fear of small closed spaces)
   ___ Yes ___ No  Blood phobia (extreme fear of needles or blood)
   ___ Yes ___ No  Phobia of any type (if Yes, briefly explain:)
   ___ Yes ___ No  Generalized anxiety disorder
   ___ Yes ___ No  Anxiety disorder of any type (if Yes, briefly explain:)
If you responded Yes, briefly explain here:

10. List any over-the-counter or prescription medications you are currently taking:

11. List the symptoms that these drugs are treating:

12. List any other medical conditions that you have or have had in the past:
13. What is your average daily caffeine consumption (approximate number of cups/glasses of coffee, tea, or caffeinated soda)?

14. What is your average weekly alcohol consumption (approximate number of alcoholic beverages)?
Appendix C

Personal Report of Public Speaking Anxiety (PRPSA; McCroskey, 1970, 2007)

**Directions:** Below are 34 statements that people sometimes make about themselves. Please indicate whether or not you believe each statement applies to you by marking whether you:

Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5.

1. While preparing for giving a speech, I feel tense and nervous.
2. I feel tense when I see the words “speech” and “public speech” on a course outline when studying.
3. My thoughts become confused and jumbled when I am giving a speech.
4. Right after giving a speech I feel that I have had a pleasant experience.
5. I get anxious when I think about a speech coming up.
6. I have no fear of giving a speech.
7. Although I am nervous just before starting a speech, I soon settle down after starting and feel calm and comfortable.
8. I look forward to giving a speech.
9. When the instructor announces a speaking assignment in class, I can feel myself getting tense.
10. My hands tremble when I am giving a speech.
11. I feel relaxed while giving a speech.
12. I enjoy preparing for a speech.
13. I am in constant fear of forgetting what I prepared to say.
14. I get anxious if someone asks me something about my topic that I don’t know.
15. I face the prospect of giving a speech with confidence.
16. I feel that I am in complete possession of myself while giving a speech.
17. My mind is clear when giving a speech.
18. I do not dread giving a speech.
19. I perspire just before starting a speech.
20. My heart beats very fast just as I start a speech.
21. I experience considerable anxiety while sitting in the room just before my speech starts.

22. Certain parts of my body feel very tense and rigid while giving a speech.

23. Realizing that only a little time remains in a speech makes me very tense and anxious.

24. While giving a speech, I know I can control my feelings of tension and stress.

25. I breathe faster just before starting a speech.

26. I feel comfortable and relaxed in the hour or so just before giving a speech.

27. I do poorer on speeches because I am anxious.

28. I feel anxious when the teacher announces the date of a speaking assignment.

29. When I make a mistake while giving a speech, I find it hard to concentrate on the parts that follow.

30. During an important speech I experience a feeling of helplessness building up inside me.

31. I have trouble falling asleep the night before a speech.

32. My heart beats very fast while I present a speech.

33. I feel anxious while waiting to give my speech.

34. While giving a speech, I get so nervous I forget facts I really know.
Appendix D

State-Trait Anxiety Inventory – Trait Version (STAI-T; Spielberger, Gorsuch, & Lushene, 1970)

1  2  3  4
Almost never  Sometimes  Often  Almost always

21. I feel pleasant.

22. I feel nervous and restless.

23. I feel satisfied with myself.

24. I wish I could be as happy as others seem to be.

25. I feel like a failure.

26. I feel rested.

27. I am “calm, cool, and collected.”

28. I feel that difficulties are piling up so that I cannot overcome them.

29. I worry too much over something that really doesn’t matter.

30. I am happy.

31. I have disturbing thoughts.

32. I lack self-confidence.
33. I feel secure.

34. I make decisions easily.

35. I feel inadequate.

36. I am content.

37. Some unimportant thought runs through my mind and bothers me.

38. I take disappointments so keenly that I can’t put them out of my mind.

39. I am a steady person.

40. I get in a state of tension or turmoil as I think over my recent concerns and interests.
Appendix E

Penn State Worry Questionnaire (Meyer et al., 1990)

Enter the number that best describes how typical or characteristic each item is of you, putting the number next to the item.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Somewhat</td>
<td>Typical</td>
<td>Very</td>
<td>Typical</td>
</tr>
</tbody>
</table>

___ 1. If I don’t have enough time to do everything I don’t worry about it.

___ 2. My worries overwhelm me.

___ 3. I don’t tend to worry about things.

___ 4. Many situations make me worry.

___ 5. I know I shouldn’t worry about things, but I just can’t help it.

___ 6. When I am under pressure I worry a lot.

___ 7. I am always worrying about something.

___ 8. I find it easy to dismiss worrisome thoughts.

___ 9. As soon as I finish one task, I start to worry about everything else I have to do.
10. I never worry about anything.

11. When there is nothing more I can do about a concern, I don’t worry about it anymore.

12. I’ve been a worrier all my life.

13. I notice that I have been worrying about things.

14. Once I start worrying, I can’t stop.

15. I worry all the time.

16. I worry about projects until they are all done.
### Appendix F

#### Threat-Neutral Word Pairs

<table>
<thead>
<tr>
<th>Negative evaluation</th>
<th>Social situations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stupid-Tokens</td>
<td>Meeting-Quarter</td>
</tr>
<tr>
<td>Mocked-Ballot</td>
<td>Interview-Lunchroom</td>
</tr>
<tr>
<td>Foolish-Lighted</td>
<td>Public-Attire</td>
</tr>
<tr>
<td>Embarrassed-Microscopic</td>
<td>Audience-Feathers</td>
</tr>
<tr>
<td>Failure-Hunting</td>
<td>Conversation-Householders</td>
</tr>
<tr>
<td>Disgraced-Multitude</td>
<td>Assessment-Signatures</td>
</tr>
<tr>
<td>Pathetic-Cleaners</td>
<td>Speech-Pastel</td>
</tr>
<tr>
<td>Inferior-Shearing</td>
<td>Presentation-Instrumental</td>
</tr>
<tr>
<td>Worthless-Batteries</td>
<td>Crowd-Tract</td>
</tr>
<tr>
<td>Ridiculed-Mythology</td>
<td>Examination-Commodities</td>
</tr>
<tr>
<td>Inept-Depot</td>
<td>Party-Lotus</td>
</tr>
<tr>
<td>Criticized-Stagecoach</td>
<td>Socialize-Geometric</td>
</tr>
<tr>
<td>Inadequate-Transition</td>
<td>Performance-Connections</td>
</tr>
<tr>
<td>Ashamed-Bridges</td>
<td>Dating-Museum</td>
</tr>
<tr>
<td>Humiliated-Waterproof</td>
<td>Engagement-Manifested</td>
</tr>
<tr>
<td>Incompetent-Coefficient</td>
<td>Stage-Scans</td>
</tr>
<tr>
<td>Somatic sensations</td>
<td>Physical threat</td>
</tr>
<tr>
<td>Sweating-Creature</td>
<td>Injury-Sipped</td>
</tr>
<tr>
<td>Tense-Backs</td>
<td>Disease-Remarks</td>
</tr>
<tr>
<td>Nervous-Outcome</td>
<td>Cancer-Saddle</td>
</tr>
<tr>
<td>Dizzy-Flute</td>
<td>Lethal-Racket</td>
</tr>
<tr>
<td>Shaky-Satin</td>
<td>Pain-Flew</td>
</tr>
<tr>
<td>Trembling-Statewide</td>
<td>Ambulance-Momentary</td>
</tr>
<tr>
<td>Suffocating-Constituent</td>
<td>Deadly-Tinted</td>
</tr>
<tr>
<td>Breathless-Shorelines</td>
<td>Illness-Summers</td>
</tr>
<tr>
<td>Nausea-Confer</td>
<td>Emergency-Listening</td>
</tr>
<tr>
<td>Blushing-Arranged</td>
<td>Violence-Integral</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Gasping-Request</td>
<td>Doctor-League</td>
</tr>
<tr>
<td>Collapse-Softener</td>
<td>Coffin-Edited</td>
</tr>
<tr>
<td>Lightheaded-Approximate</td>
<td>Stroke-Planet</td>
</tr>
<tr>
<td>Gagging-Context</td>
<td>Fatal-Wagon</td>
</tr>
<tr>
<td>Faint-Aisle</td>
<td>Hospital-Editions</td>
</tr>
<tr>
<td>Palpitations-Computerized</td>
<td>Coronary-Receipts</td>
</tr>
</tbody>
</table>