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The Influence of Diaphragmatic Breathing to Reduce Situational Anxiety for Basic Course Students

*Marlina Marie Howe
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Communication anxiety is one of the most common anxieties and thus, it continues to be a concern for speech teachers, students, and researchers in the field of communication. Approximately 70% of the general public report public speaking anxiety and up to 20% indicate an overall communication anxiety (Richmond & McCroskey, 1998). For a college student, taking a public speaking class means he/she must learn public speaking skills as well as conquer his/her anxiety about public speaking.

Considerable research has focused on how to help students overcome communication apprehension (CA), “the fear or anxiety associated with real or anticipated communication with others” (McCroskey, 1977, p. 78). A speech instructor can choose from a variety of researched techniques including systematic desensitization (McCroskey, 1972), cognitive restructuring (Meichenbaum, 1977), COM therapy (Motley, 1991), or visualization (Ayres & Hopf, 1985) to assist their students in overcoming the anxiety, however, this is not always an easy process (Ayres & Hopf, 1992). Some techniques consume too much time to be taught extensively in a normal public speaking class (Robinson, 1997).

One intervention that instructors could easily teach to their public speaking students is diaphragmatic breathing (DB), a technique distinguished by the abdomen rising as an individual slowly inhales and by the abdomen retracting as an individual slowly exhales (Greenberg, 2003; Seaward, 1998). Researchers in fields other than communication have found that DB has helped to reduce test anxiety (Wilkinson, Buboltz, & Seemann, 2001), lower blood pressure (Grossman, Grossman, Schein, Zimlichman, & Gavish, 2001), lower asthmatic and breathlessness symptoms (Peper & Tibbetts, 1992), lessen anxiety and panic attacks (Lum, 1976; Ley, 1991), lower epilepsy episodes (Fried, 1987), and reduce the chance of a second coronary heart attack (Van Dixhoorn, 1990). DB has even shown a “trend toward decreased anxiety overall” with dental patients (Biggs, Kelly, & Toney, 2003, pp. 105).

In the communication literature, only a few investigations have examined the use of DB in public speaking courses, yet with limited participant pools that produced inconclusive results (German, Dwyer, Denker, Milleman, Allen, Anderson, & Culiver, 2003; German, 2004). Thus, the purpose of this investigation was to examine the effectiveness of teaching DB in the public speaking classroom including its effect on reducing overall CA and public speaking context CA, as well as trait and state anxiety.

LITERATURE REVIEW

Communication Apprehension

CA has evolved from the original “broadly based anxiety related to oral communication” (McCroskey, 1970, p. 270) to a definition that involves trait-like CA, “a personality-type orientation toward a given mode of communication across a wide variety of contexts” (McCroskey, 1984, p. 16), context-based CA, “a relatively enduring, personality-type orientation toward communication in a given context” such as public speaking, meetings, group discussions, and interpersonal interactions (McCroskey, 1984, p. 16), audience based CA, “a relatively enduring orientation towards communication with a given person or group of people” (McCroskey, 1984, p. 17), and situational or state CA, a transitory orientation towards communication in a given situation that dissipates quickly when the situation is over (McCroskey, Richmond, & Davis, 1986).

The effects on those who experience high overall CA (high CAs) can be devastating. High CAs often choose careers that require less communication (Daly & McCroskey, 1975), are less likely to be promoted (Daly & Leth, 1976), feel less satisfied in their job, interact with others less, have fewer close relationships (Daly & Stafford, 1984; Richmond, 1984), talk less in an interview, look at an interviewer less, receive lower ratings from interviews, and are less likely to receive a job offer (Ayres, Keereetaweep, Chen, & Edwards, 1998).

As students, high CAs are more likely to drop out of school and earn a lower grade point average when compared with low CAs (McCroskey, Booth-Buttfield, Payne, 1989; Ericson & Gardner, 1992). High CAs tend

to choose a seat in the back or at the edges of the classroom, enroll in larger sections over smaller class sizes, and avoid assistance from others (McCroskey, 1978).

State and Trait Anxiety

As well as experiencing CA, public speaking students may also encounter varying degrees of general anxiety. Anxiety in general is defined “as an unpleasant emotional state or reaction that can be distinguished from others, such as anger or grief, by a unique combination of experiential qualities and physiological changes” (Spielberger & Rickman, 1991, p. 69). One who experiences anxiety has feelings of tension, worry, and nervousness, and these feelings are frequently distinguished by increased blood pressure, rapid heart rate, sweating, irregularities in breathing, and weakness or restlessness (Spielberger & Rickman, 1991). A distinction between state and trait anxiety has been made (Spielberger, 1972). State anxiety is a situational and temporary negative emotional response an individual feels in a threatening or dangerous situation (Harrigan, Wilson, & Rosenthal, 2004). State anxiety is different from situational CA in that state anxiety is the general emotional response at a particular time in a given situation while situational CA refers to the overall feelings of anxiety toward communication in a situation. Trait anxiety in general refers to frequent and intense feelings of anxiety over time and situations (Barnes, Harp, & Jung, 2002; Spielberger, 1972). On the other hand, traitlike CA refers to a personality orientation toward communication in many contexts of communication (Richmond & McCroskey, 1998).

Treatment. Communication researchers have found several helpful techniques for helping students reduce CA including systematic desensitization, the pairing of deep muscle relaxation with graduated anxiety-eliciting stimuli in the speech making process (McCroskey, 1972), cognitive restructuring, identifying negative self-talk about public speaking and replacing those irrational thoughts with positive coping statements (Fremouw & Scott, 1979), visualization, building of self-efficacy by imagining oneself giving a successful speech (Ayres, Hopf, & Ayres, 1997), and skills training or rhetrorithery, learning and practicing effective speech making and delivery skills (Phillips, 1997; Kelly, 1989). Many of these CA interventions require a lot of class time to teach and to practice. Public speaking instructors are often confronted with having to choose not to teach interventions or to choose the intervention that takes the least amount of class time even though may not be the most effective at helping all students reduce their CA (Ayres & Hopf, 1985). In addition, some instructors are reluctant to teach anxiety reduction techniques because they are not psychologists. One technique that has been suggested for treating classroom CA is diaphragmatic breathing (DB) as it requires only a few minutes of in-class time. However, DB has received very little research attention in the communication literature.

Diaphragmatic Breathing

Breathing is a bridge to functions in the body because of it's connection to sympathetic and parasympathetic actions of the autonomic nervous system (ANS)

(Norris, 2002). For example, a person under stress arouses or stimulates their sympathetic nervous system and provokes physical responses in their body (i.e., heart rate rises, perspiration, tense muscles, rapid and shallow breathing). The degree of this arousal and physical response depends on the amount of stress perceived in the situation. When a person is in this state, it is difficult to consciously slow one's heart beat and relax one's muscles. By using DB as an intervention technique a person can ignite his/her parasympathetic nervous system to take over, stimulating a decrease in his/her heartbeat and relaxing both his/her body and mind (<https://www.amsa.org/healingthehealer/breathing.cfm>). Actually, DB is one of the best ways to calm the ANS and reverse the effects observed when the sympathetic nervous system is stimulated (Norris, 2002).

DB, also called “deep abdominal breathing” or “belly breathing,” is distinguished by the abdomen rising and retracting as an individual inhales and exhales, respectively (Greenberg, 2003; Seaward, 1998). When practicing DB participants will: 1) inhale deeply through their noses, if possible, for a slow count of four (abdomens rise, not their chests), 2) hold for a another count of four, 3) breathe out slowly through their mouths for a slow count of four (abdomens retract), and 4) take a few regular breaths before continuing in the same format (Bourne, 2000). By practicing as few as ten deep abdominal breaths for three to five minutes at a time, a person can achieve moderate relaxation and reduce the physiological responses to anxiety and panic (Bourne, 2000; Seaward, 1998). This means DB could help reduce anxiety a person may experience during an anxiety-provoking situation like public speaking.

Researchers in physiology and health fields have found a significant reduction in frequency of panic attacks, self-reported anxiety, and depression when individuals practiced DB (Clark, Salkovskis, and Chalkley, 1985). In addition, some reported that students reduced test anxiety by practicing breathing techniques (Lehrer & Woolfolk, 1984; Wilkinson et al., 2001).

Women who practiced DB for at least two weeks reduced hot flash rates during menopause by fifty percent (Freedman, Woodward, Brown, Javaid, & Pandey, 1995; Freedman & Woodward, 1992; Gibney & Peper, 2003). Trained asthmatic patients who practiced DB for a sixteen-week period, reduced the intensity of asthmatic attacks, decreased medication use, and increased participation in physical activities (Girodo, Ekstrand, & Metivier, 1992).

Patients who practiced DB improved hypertension, functional chest disorder, chronic obstructive pulmonary disease (COPD), and cardiac rehabilitation by correcting an imbalance in breathing (Gilbert, 2003). Heart attack patients using DB even reduced their chances of having a second heart attack (Farhi, 1996).

Wilkinson et al. (2001) suggested stress reduction methods often left out simple deep breathing techniques to cope with stress and anxiety. In stressful situations, individuals can respond by breathing shallowly and rapidly, reducing the amount of carbon dioxide in their blood stream (Hendricks, 1995). Shallow and rapid breaths combined with a stressful situation can result in the body chemistry registering a sign of high stress or anxiety (Wilkinson, et al., 2001). A decrease of carbon dioxide in the blood stream causes the heart to pump rapidly, and thus produce dizzy, tingly, or jittery feel-

ings (Bourne, 2000). Most people don't know that the reduced levels of carbon dioxide occurring during stressful situations foster anxiety (Wilkinson et al., 2001). This pattern of breathing could affect how a person approaches a public speaking situation. Because CA is an anxiety, DB could be administered as a treatment, specifically in public speaking situations. Thus, by instructing students to slow down respiration through DB, many students could potentially correct their breathing patterns and lower anxiety or the jittery feelings of nervousness (Wilkinson et al., 2001).

Only two communication studies have explored the impact of DB on reducing CA in the public speaking context, and both relied on very few participants with inconclusive results (German et al., 2003; German, 2004). A preliminary study of thirty public speaking students consisted of sixteen participants who were introduced to skills training and fourteen students who were introduced to skills training and DB prior to giving a speech. Those students who were exposed to DB reported less speech anxiety during all speeches than those enrolled in the same public speaking course where s/he received only skills training in the course (German et al., 2003). German et al. (2003) concluded that DB does decrease CA but recommended that additional research needs to be done with a larger sample.

In a second study, German (2004) investigated 155 public speaking students, 77 students learned public speaking skills and 78 students learned public speaking skills and practiced DB immediately prior to giving formal speeches. She found that public speaking skills training was effective at reducing overall CA and communication state anxiety. However, she found skills

training was as effective at reducing CA as DB. German noted that DB was only practiced at each speech time and could have been an added stressor effecting the results of her study. In addition, she said instructors may not have been experienced or confident enough to teach the techniques as they should have been taught. Some had taught DB prior to the first data collection which may have affected the results. German (2004) recommended future studies that integrate DB into the public speaking course regularly, not only prior to speech presentations as well as implement ongoing DB training for instructors.

The purpose of this study was to investigate the effectiveness of using DB to reduce anxiety for public speaking students. Based on the importance of helping students reduce CA in the public speaking course and the current research that supports the effectiveness of DB in reducing anxiety and stress in other contexts, the following research questions were proposed:

- RQ1: Will diaphragmatic breathing be more effective at reducing student self-reported overall communication apprehension or public speaking context communication apprehension than only a skills training public speaking course?
- RQ2: Will diaphragmatic breathing be more effective at reducing student self-reported state anxiety during public speaking than only a skills training public speaking course?
- RQ3: Will diaphragmatic breathing be more effective at reducing student self-reported

trait anxiety during public speaking than only a skills training public speaking course?

METHODOLOGY

Participants

Participants in this study included 156 undergraduate students enrolled in twelve sections of an introductory college public speaking course at a large Midwestern university. Respondents represented a variety of class rankings (93 freshmen, 30 sophomores, 17 juniors, 12 seniors), majors, and educational backgrounds because this was a university-wide required general education course for all undergraduate students. Participation in the study was voluntary and anonymous.

Students enrolled in the 16-week course were taught using a standardized syllabus (i.e., book, workbook, classroom assignments, and speech requirements). Eight instructors who taught twelve sections of the Fundamentals of Public Speaking course were included in the study. Institutional Review Board (IRB) approval was received and no restrictions based on age or gender were placed on the sample because collection of data was part of a university assessment process.

Procedure

Investigators administered the PRCA-24 (McCroskey, 1982) to all participants during the first and last week of classes in fall 2004. One hundred fifty-six stu-

dents in intact classes completed all parts of the PRCA-24, including 46 participants in the control group and 110 participants in the experimental group. The difference in the size of the control and experimental group was related to instructor assigned teaching load for the semester. Every instructor was asked to teach DB to one class. Some instructors taught two classes (one experimental, one control) and others taught only one class (experimental). Both the control and experimental groups were taught basic skills training and practiced public speaking by completing four formal speeches.

Immediately following each student's four formal speeches, participants filled out the Spielberger State-Trait Anxiety Inventory (STAI, Spielberger, Gorsuch, & Lushene, 1970), to assess both state and trait anxiety. After students gave their first speech s/he received the STAI form; questionnaires were completed and returned during the same class period that the speech was given. This process of distributing and collecting STAI forms after each student's speech was continued for the remainder of the semester and resulted in four completed STAI forms from each student in both the control and experimental group.

The control group received instruction in public speaking fundamentals class only. The students in the experimental group received instruction in public speaking fundamentals and were led through five minutes of a DB exercise at every class period (see Appendix A) starting after the first round of speeches and continuing every class period until the end of the semester. Instructors attended a training session on DB prior to the first round of student speeches and were given instructional material on how to teach DB to their stu-

dents. Instructors had students stand, close their eyes and concentrate on breathing, placing one hand on their chests and the other on their abdomens to ensure that their abdomens were rising and not their chests, demonstrating a deep breath. Then they taught students to breathe in slowly through their noses for a slow count of four, then to hold the breath for a count of four while smiling, and exhale out through their mouths for another slow count of four making a wind sound. The instructor led the students through ten deep breaths, relaxing between breaths.

Instrumentation

Personal Report of Communication Apprehension (PRCA-24). McCroskey's Personal Report of Communication Apprehension (PRCA-24; 1982) was used to measure trait-like overall CA and context-based CA. The 24-item self-report measures overall CA across four contexts and for each context: interpersonal conversations, group discussion, meetings, and public speaking (McCroskey, 1982). Its five-point Likert-type scale has been used extensively and found to be reliable (e.g., Rubin & Graham, 1988; Rubin, Rubin, & Jordan, 1997).

The obtained reliability coefficients (Chronbach alpha) for the PRCA-24 overall scale used in this study were (for Pretest and Posttest, respectively) .95 and .94. The obtained reliabilities for the context scales were (for Pretest and Posttest, respectively): groups, .87 and .89; meetings, .91 and .71; interpersonal, .89 and .67; and public speaking, .88 and .73.

State-Trait Anxiety Inventory (STAI). State and trait anxiety were measured after each of four required

speeches during the semester using Spielberger's State-Trait Anxiety Inventory (STAI). This survey is a 40-item self-report consisting of two separate 20-item self-report scales; Y-1 measures state anxiety and Y-2 measures trait anxiety. Participants read 20 statements from Form Y-1 related to state anxiety and chose responses on how s/he felt "right now, at this moment" on a four-point scale: (1) *Not at all*; (2) *Somewhat*; (3) *Moderately so*; (4) *Very much so*. Participants circled the number that best illustrated their present feelings at the time for each statement (e.g., I am jittery, I feel nervous, I feel frightened, I feel calm). Participants then read 20 statements from Form Y-2 related to trait anxiety and were asked to evaluate how s/he felt "generally" on a four-point scale: (1) *Almost never*; (2) *Sometimes*; (3) *Often*; (4) *Almost Always*. Participants again circled the number that best described their general feelings for each statement (e.g., I am "calm, cool, and collected," I am happy, I have disturbing thoughts, I lack self-confidence). Approximately one-half of the STAI scale was reverse-scored. Each student received a score ranging from a minimum of 20 to a maximum of 80 for each scale. The higher the summed score for the state or trait self-report, the higher the state or trait anxiety. Barnes et al. (2002), from a review of 816 studies using the STAI instrument between 1990 and 2000, reported acceptable reliability coefficients for both internal consistency and test-retest (State, internal consistency $M=.91$; $SD=.05$; test-retest $M=.70$; $SD=.20$; Trait, internal consistency $M=.89$; $SD=.05$; test-retest $M=.88$; $SD=.05$). The obtained reliability coefficients (Chronbach alpha) for STAI state and trait scales used in this study were (for

time periods 1 through 4, respectively) state, .93, .94, .91, and .93; and trait, .90, .91, .90, and .91.

RESULTS

The first research question asked if diaphragmatic breathing (DB) was more effective at reducing student self-reported overall communication apprehension (CA) or public speaking context CA as measured by the PRCA-24 (McCroskey, 1982) than only a skills training public speaking course. A 2×2 repeated measures analysis of variance (ANOVA) with overall pre-and post-test CA scores as dependent variables showed no *significant* interaction, $F(1, 154) = 2.208, p = .156$ and no treatment main effects, $F(1, 154) = 1.375, p = .243$. A 2×2 repeated measures analysis of variance (ANOVA) with public speaking context pre-and post-test CA scores as dependent variables showed no significant interaction, $F(1, 154) = 0.702, p = .403$ and no treatment main effect, $F(1, 154) = 1.906, p = .169$. The research question was answered in the negative because there was no difference in overall CA scores or public speaking context CA scores between the treatment and control groups. However, there was a significant main effect for overall CA, $F(1, 154) = 58.661, p < .0005$ and for public speaking context CA, $F(1, 154) = 56.266, p < .0005$. The pre-test overall CA scores and public speaking context scores were significantly higher than the post-test scores. See Table 1 for a summary of the reported means and standard deviations for all variables.

The second research questions asked whether students in the experimental group would experience a

Table 1
Summary Table of Reported Means and Standard Deviations for all Variables

Measurement	N	Speech 1	Speech 2	Speech 3	Speech 4
<i>PRCA</i>					
Experimental DB					
Public Speak	110	19.50(5.60)			16.50(5.21)
Overall	110	63.02(18.48)			56.37(16.11)
Control					
Public Speak	46	20.95(4.93)			17.19(4.99)
Overall	46	67.51(15.50)			57.82(14.25)
<i>STAI</i>					
Experimental DB					
State	110	43.35(10.96)	42.63(10.51)	38.44(10.45)	38.35(9.44)
Trait	110	37.11(8.61)	37.37(9.20)	36.14 (8.45)	34.90(8.50)
Control					
State	46	39.74(11.23)	42.70(11.23)	38.02(11.54)	40.43(11.18)
Trait	46	36.46(9.55)	35.37(7.63)	34.80(8.52)	34.04(8.75)

Note: Numbers in parentheses are standard deviations.

greater decrease in state anxiety as measured by Spielberger's STAI Form Y-1 than those in the control group. A repeated measures 2×4 ANOVA, with state anxiety scores at the four speech times used as dependent variables, showed there was a significant interaction between the four speech times and treatment, $F(3, 152) = 3.653$, $p = .014$. The follow-up simple main effects test indicated there were no significant differences between treatment groups at each speech time, Speech 1, $F(1, 154) = 3.460$, $p = .065$; Speech 2, $F(1, 154) = 0.001$, $p > .971$; Speech 3, $F(1, 154) = 0.048$, $p < .871$; and Speech 4, $F(1, 154) = 1.410$, $p < .237$. However, the simple main effects test for each of the treatment groups across the speech times were both statistically significant, control, $F(3, 152) = 3.653$, $p = .014$; experimental, $F(3, 152) = 14.523$, $p < .005$.

To investigate the significant simple main effects, we used pairwise comparisons using the Bonferroni adjustment. The results indicated that for the control group there was a significant difference between speech times 2 and 3 and for the experimental group, there were significant differences between speech times 1 and 3, 1 and 4, 2 and 3, and 2 and 4. Thus, we can conclude for research question two that the experimental group did experience a greater decrease across the various speech times than the control group (See Figure #1 for the plot of trends in state anxiety mean scores for the control and experimental groups).

Similarly, the third research question asked whether students in the experimental group would experience a greater decrease in trait anxiety as measured by Spielberger's STAI Form Y-2 than those in the control group. A repeated measures 2×4 ANOVA, with trait anxiety

State Anxiety Means For Control and Experimental Groups

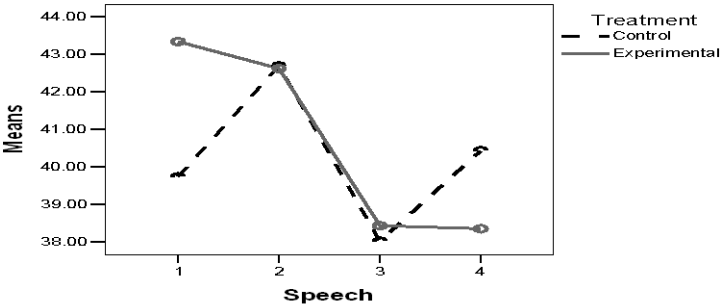


Figure 1. State Anxiety means for Control and Experimental Groups

scores at the four speech times used as dependent variables, showed a non-significant interaction, $F(3, 462) = 0.676, p = .567$ and a non-significant group main effect, $F(1, 154) = 0.763, p = .304$. However, there was a significant main effect for the trait anxiety scores at the fours speech times, $F(3, 462) = 7.923, p < .0005$. Follow-up Tukey pairwise comparison tests, using a .05 family-

Trait Anxiety Means For Control and Experimental Groups

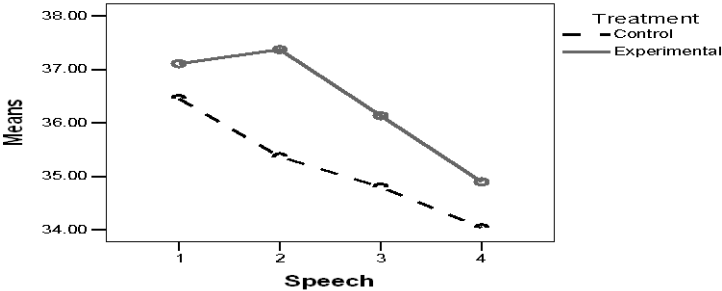


Figure 2. Trait Anxiety means for Control and Experimental Groups

wise alpha, indicated that there was a significant difference from Speeches 1 and 2 to Speech 4. Thus, we can conclude for research question three that the experimental group did not experience a greater decrease in trait anxiety than the control group over the course. Both groups experienced a decrease from Speeches 1 and 2 to Speech 4. See Figure #2 for the trends in trait anxiety mean scores for the control and experimental groups.

DISCUSSION

The purpose of this study was to determine if students who practiced DB techniques every class period after their first speech experienced a greater reduction in overall or trait-like CA, public speaking context CA, state anxiety, or trait anxiety than those who were taught only public speaking skills.

The results for research question one indicated that although both the control and experimental group experienced significant decreases in overall and public speaking context CA, there was no significant differences between the two groups. This would suggest that students who received only skills training experienced similar reductions in overall CA and public speaking context CA levels when compared to those who learned DB in addition to public speaking skills training. These findings support prior research that found skills training is an effective intervention for reducing CA, especially in a basic public speaking course (Dwyer & Fus, 1992; Kelly, Duran, & Stewart, 1990; Rubin et al., 1997).

Results for research question two indicated that both the control and experimental group experienced significant decreases in state anxiety from the first to fourth speech. Overall, the experimental group experienced a greater decrease across the various speech times than the control group. These results indicate that DB is a possible and plausible treatment intervention for students who report higher feelings of nervousness in a public speaking situation. It should be noted that the experimental group did initially report higher state anxiety after the first speech which could indicate that the technique is more helpful for those who experience higher levels of state anxiety or general nervous feelings.

When we consider why DB showed some impact on changes in state anxiety scores but not on changes in public speaking context CA or trait-like CA (overall CA), we speculate that this can be explained by the differences in constructs and measurements. The PRCA-24 instrument, taken pre- and post-course, measured perceptions of anxiety in several communication specific contexts. It was not intended to measure state anxiety or general trait anxiety.

The state anxiety scores, measured by Spielberger's scale at the time of the public speaking situations, showed that DB affects the general feelings of nervousness students experience at the time of the situation—in this case, giving a speech. These current findings on using DB to help reduce state anxiety add to the body of literature that already exists on applying DB to aid in the reduction of state anxiety (Serok, 1991).

Previously Serok (1991) found teaching breathing techniques to college students helped reduce their test

anxiety. However, few researchers, if any, have examined the use of DB to help public speaking students reduce state anxiety. The present study suggests further research on the effects of DB is warranted because so many students experience physical anxiety, nervousness, or jitters before and during a speech.

For research question three, results indicated that although there was a significant reduction in pre to post class trait anxiety scores for both the control and experimental group, there was no significant difference between the two groups. Both groups experienced a decrease from Speeches 1 and 2 to Speech 4. This indicates that DB does reduce trait anxiety, however it is not any more effective at reducing trait anxiety than public speaking skills training alone.

The results for research question two and three show slight fluctuations in state and trait anxiety over the course of a semester. These fluctuations are likely due to the variations in grade weighting and in the requirements assigned for each speech. For example, the first and third speeches were worth 10% of the final grade while the second and fourth speeches were worth 20% of the final grade. The third speech required students to work in dyads and present together while the other three speeches were individual presentations. When students speak with a partner they often experience less anxiety because they feel less conspicuous and as feelings of conspicuousness decrease so do feelings of anxiety (Daly & Buss, 1984). Thus, this could explain the drop in anxiety for the control group at the third speech and then the rebounding higher level of anxiety for the forth speech, while the experimental group sus-

tained the drop in anxiety for both the third and forth speeches.

The purpose of this study was to examine the effectiveness of using DB to help students in a public speaking class reduce overall trait-like CA and context CA as well as state and trait anxiety. Consistent with literature in other fields, results have shown that DB is a possible and plausible intervention technique for reducing state anxiety.

Certain factors limit the interpretation of this study's results. First, the findings of this study were conducted using one sample from one university. Thus, generalizations are limited. Although the public speaking course was standardized, there could be variations in instructors, their teaching, and even in class meetings. Classes were intact and did not represent a random sample of the student population who were enrolled in the course. In addition, there are limitations regarding the initial anxiety levels of the groups. For example, the experimental group, by chance, started with a higher mean state anxiety level than the control group and in the end the control group actually reported a slight, non-significant, increase in anxiety. The decreases from time one and two to time four for the experimental group may account for or not account for the higher initial anxiety levels.

The number of practice sessions covered in class also could affect the results. Some participants practiced DB three days per week while others only practiced twice per week, depending on a MWF or TR class schedule. Those students who met three time per week practiced DB more times than those who met only twice per week

and more practice sessions could have helped reduce anxiety more.

Administering DB and ensuring that all students in the experimental group practiced DB every class period was another challenge. All instructors in the experimental group led students in DB during the first ten minutes of the class period. However, as in most college classrooms, some students walked in late and then missed the DB practice session. Because DB is a learned skill, the more a person practices it, the more effective DB will become. Conversely, the less a person practices it, the more likely it is that he/she did not spend enough time practicing the technique for it to help reduce anxiety. Future studies need to try to control these classroom variables.

In an attempt to control classroom variables, future research might include interviews with students about their experiences using DB. Interview questions could address 1) how supportive the instructor had been in helping students learn DB, 2) how supportive the class had been in helping students practice DB, 3) if the students believed DB helped decrease their public speaking anxiety, and 4) how many times the students actually practiced DB, both inside and outside the classroom.

This study supports the possible use of DB as a technique for reducing state anxiety related to public speaking. Previous research has shown good results for using DB to help reduce anxiety in a number of different contexts. Thus, we recommend the use of DB to public speaking instructors (just as other professionals offer DB to clients for anxieties, panic disorders, and other medical conditions) to use as an instructional technique to help students reduce nervousness and jitters. DB

could be a useful instructional strategy for state anxiety interventions because only three minutes of regular practice is needed for it to be effective. While previous research on the treatment of CA has focused on more time-consuming intervention methods such as systematic desensitization, visualization, and cognitive restructuring; future studies should continue to explore the potential use of DB as a less time-consuming, yet effective intervention.

Future research needs to continue to examine the practice of DB as a take-home assignment. Health professionals recommend that participants practice DB daily as part of their everyday lives in order for DB to be most effective (Cosnett, 2002). By practicing DB daily, it becomes familiar and may be more apt to calm students' bodies and minds in an anxiety producing situation, like public speaking. Studies in and out of the classroom need to include larger samples and instructors who teach at least two public speaking classes so that teaching strategies would be consistent across experimental and control groups. Instructors would teach DB to one class everyday and not the other class for the sake of comparison.

Instructors need to lead students in DB after all students have arrived for class and thus, prevent potential interruptions from students arriving late. DB could be practiced at the end of every class period and instructors could offer some incentive for students who practice DB outside of the classroom. For example, teachers could assign students to keep a journal, write in it when they practice DB and describe how it is impacting their anxiety levels.

Future investigations should combine DB with other intervention techniques (e.g., cognitive restructuring, visualization, COM therapy, etc.). Previous research has indicated that combining intervention methods is more effective than using only one method (Allen, Hunter, & Donohue, 1989; Ayres & Hopf, 1993; Dwyer, 2005). To help students further reduce anxiety, instructors could teach students to close their eyes and talk to themselves using positive coping statements about the process. For example, during the counting process one could teach students to say things such as "I'm breathing deeply," "I'm slowing down," "I'm becoming calm," and "I'm letting everything go." By teaching students to think about breathing while they practice, it will help them integrate both mind and body into the experience. If students aren't talking to themselves with positive coping statements then they might be counteracting the diaphragmatic breaths with negative and anxiety-arousing thoughts.

In conclusion, the results of this study suggest the possible benefits of integrating DB into the public speaking classroom as a potential intervention technique for students who experience nervousness and state anxiety when giving a speech. Since research indicates that the strategies chosen to help students reduce speech anxiety are often left to the teachers (Robinson, 1997), basic course instructors may choose to include this easy-to-teach three-minute DB technique to help their students become calmer speakers. Basic course instructors have the opportunity to make a difference for many students who enroll in their courses. Thus, those who are looking for a time-efficient intervention to help students reduce state anxiety may want to consider

teaching DB to their students and practicing it regularly in their classrooms.

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APPENDIX A

Background and Instructions for Diaphragmatic Breathing

Diaphragmatic breathing, also known as deep abdominal breathing or belly breathing has been used to reduce tension and anxiety during testing, dental visits, phobia attacks, and public speaking.

You can learn to control situational anxiety and increase your concentration through diaphragmatic breathing. In stressful situations, individuals tend to breathe rapidly and shallow, leading to reductions in carbon dioxide levels in the blood stream which contribute to feelings of anxiety. Diaphragmatic breathing can stop the reductions, clear your mind, relax your body, and maintain the body's biochemical balance.

Tell the students that we will be tracking their anxiety level and change in it over the semester so they can see their progress so they will be completing a short survey after each speech.

Steps to follow for diaphragmatic breathing

1. Stand up, feet shoulder-width apart and briefly stretch (move hands, neck, arms). You can also have students relax in their seats, having the students rest their backs on the back of the chair.
2. Close your eyes and concentrate on your breathing.
3. Place one hand just under your ribcage, locating your abdomen. Place your other hand on your chest (this hand should barely move).

4. Inhale slowly and deeply through your nose for a slow count of four while counting to yourself (one one-thousand, two one-thousand, three one-thousand, four one-thousand). Your belly should move down and outward. It may help to picture your abdomen as a beach ball. As you draw air in, it expands. Your chest should barely move. (Note: most people shallow breathe and will feel their chest expand instead of their abdomen. Concentrate on breathing through your abdomen and not your chest.)
5. Pause slightly and smile for a slow count of four. Smiling releases endorphins (natural mood elevators) in your blood.
6. Now, exhale slowly and fully through your mouth, making a whooo sound like the blowing wind, for a slow count of four counting to yourself again (one one-thousand, two one-thousand, three one-thousand, four one-thousand).
7. Relax and take a few normal breaths. Tell your body to go loose and limp. Make an effort to let all tension drain away from every part of your body.
8. Continue taking at least *ten* deep abdominal breaths with slow, full exhales in order to trigger relaxation while keeping your eyes closed.

The slow, controlled release of air from the lower lungs triggers the full relaxation response. If you do the exercise properly, the muscles in your neck and shoulders will release their tension immediately.