

The SHAKEDOWN OF WARM-UPS: AN ASSESSMENT OF PRE-SPEECH EXERCISES' IMPACT ON PUBLIC SPEAKING ANXIETY

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Abstract

Academics have suggested that the use of warm-up exercises like those used by forensics competitors before a competition may reduce students' public speaking anxiety (PSA). However, little empirical work has assessed these anecdotal claims. Thus, to assess the impact of using warm-up exercises in the foundational course, we developed and tested a uniform warm-up protocol for students enrolled in our standardized, multi-section public speaking course. This study sought to discover whether students who engaged in physical and vocal function exercises prior to speech delivery would have lower speaking anxiety over the course of the semester than students in the control group. Although this assessment found no significant difference in PSA reduction for students enrolled in designated warm-up sections compared to students within the control group, these findings can guide the next steps toward optimal, evidence-based best practices for warm-ups in the introductory speech course. In light of past research and robust instructor perceptions regarding the anxiety-reducing benefits of warm-up exercises, this assessment reveals the need to test alternative warm-up protocols to help mitigate PSA, to measure for changes in state as well as trait apprehension, and to determine the treatments' effects on individuals with differing degrees of PSA.

KEY TERMS: Assessment, Public Speaking, Anxiety, Warm-ups

The Center for Collegiate Mental Health (2019) has documented anxiety and depression as the most common concerns of students seeking counseling at collegiate health centers. Furthermore, the American College Health Association's Spring 2019 report compounds the significance of anxiety in college students, revealing 66% of students had experienced overwhelming anxiety in the past year. This increased presence of anxiety and depression has impacted the introductory communication course. Simonds and Hooker (2018) posited, "the introductory communication course is fertile ground for the frequent emergence of mental health issues (in general) and anxiety-related issues (specifically)" (p. 394). As such, course directors

and instructors are often concerned with helping their students manage anxiety-related issues that may arise for them while enrolled in an introductory public speaking course.

The introductory public speaking course “creates an environmental factor that exacerbates vulnerability in students with anxiety” (Simonds & Hooker, 2018, p. 394). Specifically, some students in this type of course experience moderate to high public speaking anxiety (PSA) (Hunter et al., 2014). Bodie (2010) defined PSA as social anxiety that arises out of a situation in which there exists a real or enacted need for oral presentation. Given the occurrence of PSA amongst students in the introductory public speaking course, course administrators and instructors are well situated to help students mitigate their fears and anxiety through tested interventions demonstrated as effective through assessment research. Thus, the principle aim of this study was to advance scholarly assessment and best practices for PSA mitigation in the foundational course by examining a tactic that instructors have long believed effective, but few have studied empirically—incorporating guided class warm-up exercises directly before student speeches. Toward that aim, we developed and tested a uniform warm-up protocol for students enrolled in our institution’s standardized, multi-section public speaking course.

Other faculty in our discipline have expressed the desire to help students mitigate their PSA and continue to examine anxiety reduction techniques including warm-up exercises. For example, recent roundtable discussions at the National Communication Association like *“Walking on eggshells:” Exploring creativity versus crisis management as pedagogy for high anxiety in the basic course* (Howell et al., 2014) and *“Do we have to speak like that?” Potentials and pitfalls of forensics in the basic course* (Hamzhee et al., 2017) have emphasized the value of using warm-up exercises to reduce students’ anxiety in the introductory communication course. The Hamzee et al. (2017) panel, which was composed entirely of forensics instructors who teach the foundational course, further converged on the anxiety-reducing power of carrying forensics-based warm-up exercises into their public speaking classrooms.

The importance of warm-up exercises has long been established as best practice prior to athletic activity, “However, until quite recently, this belief was not well supported by empirical evidence, with coaches often resorting to a trial-and-error approach to design their athletes’ warm-up strategies” (McGowan et al., 2015, p. 1524). Similarly, while anecdotal evidence abounds regarding the benefits of warming up before a speech, scholars such as Dwyer (2012) and Tedesco and Patterson (2015) have authored some of the few published works establishing these benefits empirically. Therefore, the current study developed and tested a protocol using vocal and physical warm-ups as an anxiety mitigation strategy within our introductory public speaking course.

We sought to discover whether students in a multi-section introductory public speaking course who engaged in a systematically-delivered vocal warm-up protocol, also referred to as vocal function exercises (VFEs), and physical warm-ups prior to speech delivery would have lower speaking anxiety over the course of the semester when compared to students who did not

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participate in the exercises. To frame this study, we examined the current literature on speaking anxiety, treatments, and the use of vocal and physical conditioning for skill development and treatment strategy.

Public Speaking Anxiety

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Communication educators have continued to grapple with student anxiety issues in the foundational public speaking course. The management and mitigation of student anxiety in the course continue to be of interest to introductory communication course scholars, as evidenced in recent research surrounding student anxiety (Simonds et al., 2019; Steward et al., 2019; Westwick et al., 2015). One particular area of interest focuses on public speaking anxiety. PSA is

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relatively common (Linder et al., 2019) with some individuals experiencing a temporary, context-bound, psychological state that precedes or accompanies a public speaking event, but decreases as the event comes to an end; others experiencing a trait-like condition, occurring across multiple public speaking situations (Booth-Butterfield & Booth-

Butterfield, 2004). Individuals with trait-like anxiety may be anxious about speaking in an introductory public speaking course as well as other speaking situations (Booth-Butterfield & Booth-Butterfield, 2004).

Potential consequences of high PSA may have a negative impact on student academic success as well as numerous negative career implications (Ericson & Gardner, 1992; McCroskey et al., 1989; Richmond et al., 2013). However, communication scholars have found success in PSA treatments (Duff et al., 2007; Finn et al., 2009; Hopf & Ayres, 1992; Hunter et al., 2014). As a result, college-level communication programs have found enhanced capabilities to serve apprehensive students through performing assessment research to gauge and enhance PSA reduction in their introductory public speaking courses (Hunter et al., 2014; Westwick et al., 2016).

Many introductory course instructors prioritize helping students overcome their fears associated with public speaking as a foundational goal of the course (Kinnick, 2012; Kinnick et al., 2011; Westwick et al., 2016), and report that PSA reduction serves as a critical strength of the communication discipline (Bodie, 2010). A national study examining communication apprehension treatment techniques in the introductory public speaking course identified that 81% of the programs surveyed aimed to reduce students' communication apprehension within the course and 60% focused on helping students to become physically prepared for the speaking environment (Robinson II, 1997). The study produced a list of 26 general instructional techniques designed to reduce students' apprehension—including lectures on apprehension, skills training, and helping students become primed for performance (Robinson II, 1997). Also, the inclusion of anxiety treatments within the course design has continued to demonstrate success in reducing students' PSA (Dwyer, 2000; Hunter et al., 2014). However, despite these

successes, especially given the rise in students' general anxiety, an opportunity for further reduction of students' speaking anxiety remains. As such, introductory course instructors continue to explore additional interventions and treatments that may provide further reductions in PSA to improve students' academic performance and professional success.

Previous research has shown that PSA can be managed and reduced through treatment. In a comprehensive review of PSA, Bodie (2010) identified the common PSA treatments as systematic desensitization, cognitive modification, communication-orientation modification therapy, visualization, skills training, performance feedback, and specially designed courses. Of these techniques the combined use of exposure therapy, cognitive modification, and skills training have demonstrated the most impact on student anxiety reduction. For instance, past studies have found that students enrolled in introductory communication courses which present elements of exposure therapy, cognitive modification, and skills training significantly reduced their speaking anxiety from the beginning of the course to the end in both face-to-face (Hunter et al., 2014; McCroskey, 1970) and online courses (Westwick et al., 2016).

Other research has focused on communication apprehension and speech anxiety mitigation through different techniques. Howe and Dwyer (2007) examined the impact of diaphragmatic breathing (DB) on anxiety reduction for students in the foundational communication course. The results of their study suggest "possible benefits of integrating DB into the public speaking classroom as a potential intervention technique for students who experience nervousness..." (Howe & Dwyer, 2007, p. 127). The results of their research suggest that alternative approaches to anxiety reduction may provide additional support to students enrolled in introductory public speaking classes. One potential strategy discussed amongst communication professionals (Hamzhee et al., 2017; Howell et al., 2014) includes the use of vocal and physical warm-up exercises before in-class speech delivery. While it appears that introductory course instructors are using this strategy, little evidence supports the value of warm-ups as a mitigating factor in anxiety reduction.

Embedding Vocal and Physical Warm-Ups as Additional Treatment

Vocal

Actors, singers, and forensics students alike generally regard vocal and physical warm-ups as critical aspects of their pre-performance rituals. However, little literature explores the influence of vocal warm-ups as a means to lower anxiety in the introductory public speaking course classroom. Distinguished vocal scholar, Miller (2004), contended that any singer who did not feel compelled to warm-up vocally was fooling themselves. Facilitating warm-ups to prepare singers, athletes, or even speech and debate students for their activities points to how this pre-performance exercise might be a tool for managing public speaking anxiety. While minimal literature explores the role of warm-ups on anxiety reduction, extant literature illustrates the value and role of vocal warm-ups as a means of skills training.

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Within a choral setting, warm-ups provide a means to increase vocal skills. Hoch and Sandage (2018) explained, “Throughout the history of singing pedagogy, voice training has focused overwhelmingly on the acquisition of specific skills as opposed to aspects of fatigue resistance” (p. 81). Vocal function exercises (VFEs) are used to train and condition the voice (Stemple et al., 1994), and can function as skills training for speech students as well. Additionally, VFEs offer an intervention for those with voice disorders. Angadi et al. (2017) found VFEs to be effective tools to enhance voice parameters within voices of all ranges from disordered voices to professional voice users.

Furthermore, VFEs and other vocal warm-up strategies in choral settings optimize the voice. McHenry et al. (2009) reiterated the value of these strategies and suggested that “vocal warm-up strategies can be optimized to achieve greater acoustic and aerodynamic changes in voice production” (p. 575). Furthermore, based on the principles borrowed from exercise science, vocal warm-ups should focus on skills training and gaining muscular strength (Hoch & Sandage, 2018). The work assessing the impact of vocal warm-ups to further vocal training relates directly to the introductory public speaking course in which students are learning foundational skills as speakers that range from structure to delivery techniques. As a result, strategies designed to help students prepare speech delivery also include physical warm-ups.

Physical

As with vocal warm-ups in a choral setting, physical warm-ups also prepare a person for performance. Miller (2004) argued, “Even a public speaker will benefit from a few minutes of preparatory exercises involving bodily movement” (p. 243). Additionally, Bishop (2003) stated that a three-to-five minute warm-up exercise could improve short-term performances in a range of tasks. Two types of physical training benefit a vocalist or speaker: gesture and movement. Gesture training involves upper body movements like hands and arms. In contrast, movement training includes creating a general awareness of the body’s motion, such as controlling the body’s coordination and balance movements (Liao & Davidson, 2015). In their study, Liao and Davidson (2015) found a combination of gesture and movement training presented a powerful training technique.

Athletes have long recognized the value of warm-ups and likely would not compete without first warming-up their bodies. Both athletes and coaches agree that warming-up plays a vital role in increasing athletes’ optimal performance abilities (McGowan et al., 2015). Likewise, research has shown several benefits of an active warm-up regimen, such as increases in muscle temperature, an increase in oxygen consumption, and nerve conductivity (Zois et al., 2011). In addition to physical benefits, there are psychological benefits to a physical warm-up. Athletes will often complete mental preparation before competitions, including such techniques as visualization, self-talk (i.e., cue words or arousal words), and attention focus (Tod et al., 2005). McGowan et al. (2015) explained that psychological warm-ups build self-confidence and increase attention by narrowing the individual’s focus. Similar to Liao and Davidson’s (2015) findings

regarding the benefits of a combined approach, McGown et al. (2015) found positive results from a blend of vocal and physical warm-ups.

Vocal and Physical Warm-ups as Speech Anxiety Treatment

Through the understanding of the individual efficacy of both physical and vocal warm-ups, scholars have explored the power of combining the two constructs as part of a pre-performance exercise. Cook-Cunningham and Grady (2018) found that choral physical and vocal warm-ups assisted members of a choir in becoming more prepared to sing after completing the routine. They “suggest that conductors might consider a warm-up that includes both vocal and physical exercises” (p. 198). Furthermore, Tedesco and Patterson (2015) discovered that voice pedagogy (body stretching, controlled breathing, and singing) significantly lowered an individual’s trait and state communication apprehension, while increasing their willingness to communicate and self-perceived communication competence. Given the perceptual benefits of a combined warm-up routine, further analysis in other performance settings is warranted. The previous research on vocal and physical warm-ups suggests that there may be possible benefits for students enrolled in a public speaking course. Therefore, the following hypothesis was posed in light of the relevant research on vocal and physical warm-up activity and public speaking anxiety.

H: Students who engaged in the use of physical and vocal warm-up activities prior to speech delivery in an introductory public speaking course will experience a greater decrease in public speaking anxiety than students who did not engage in the use of physical and vocal warm-ups.

Methodology

To assess the impact of in-class warm-up activities in the foundational public speaking course, this study used quantitative analysis through a pre/post-test design. Students enrolled in the introductory public speaking course were asked to complete an online survey at the semester’s beginning and end.

Overview of the Public Speaking Course

The foundational course assessed in this study is part of a standardized, multi-section course at a mid-sized Midwestern university. Although the university conducting this assessment offers both face-to-face and online sections of the course, this study focused on students enrolled in face-to-face sections only. Course standardization includes the use of the same customized textbook, speaking assignments (four major speeches throughout the semester), rubrics, and exams across all sections. The course directors are responsible for the course design and the training of all graduate teaching assistants who teach the introductory course, which allows for collaboration across all course sections.

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Face-to-face sections of the course meet in a lab/lecture format. Each graduate teaching assistant is responsible for three sections of the lab that meet twice a week for 50-minutes. Designated lab time allows for speech outline reviews, speech delivery/evaluation, and skills development. Each graduate teaching assistant also presents one 50-minute lecture each week. During lecture sessions, graduate teaching assistants disseminate key course concepts and engage the students through active learning strategies. The speech assignments progress from relatively simple speaking situations to more challenging ones. Students in the class deliver their speeches to an audience of approximately 20.

Participants

The sampling frame for this study included students enrolled in the sections of the previously discussed, multi-section, standardized introductory public speaking course. Participants included 298 undergraduate students ($n = 137$ males, $n = 156$ females, and $n = 5$ missing data) who opted to take part in the study for extra credit. A majority of students (90%) completed the course during their first year. A wide variety of student majors were represented because this course meets a university general education requirement. Participants ranged in age from 18 to 36, ($M = 18.63$, $SD = 1.81$). Further, participants identified as 87.2% Caucasian, 5% did not identify, 4.3% Hispanic/Latinx, 1.6% American Indian or Alaskan Native, and 1.6% African American.

Procedure

During the first week of classes, each graduate teaching assistant received an emailed link to the measurement instrument (entered into a QuestionPro© survey) along with the implied consent letter necessitated for human subject research. The graduate teaching assistants then emailed the message with the survey link to their students and announced a ten-point (1.25% of total points available in the course) extra credit opportunity for those who completed the questionnaire once at that time and again during the final week of class. Thus, the pretest was administered in the first week of class, and the post-test was administered during the final week of the class (week 15).

To ensure the effects measured were isolated to the treatment (warm-up) or control (no warm-up) condition, each graduate teaching assistant was asked to present the warm-up protocol in one or two of their three assigned sections, but not to facilitate warm-ups in their remaining section or sections. On every speech delivery day, after taking attendance, the graduate teaching assistant would lead the randomly assigned treatment sections through the warm-up protocol throughout the semester's duration. The presentation of the exercises took approximately five minutes, followed by student speech delivery. In the control group sections, student speeches began immediately after attendance. Within the convenience sample, there were 132 (45.3%) students in the control group, and the remaining 159 (54.6%) participants were part of the treatment group. Specific details of the warm-up protocol/treatment are discussed below.

Description of Warm-up Protocol

The intervention used in this study intentionally leveraged exercises to warm-up both the body and voice to fully prepare the speaker for the physical aspects of the speaking performance. The institution's Director of Forensics designed the intervention based on the research related to vocal and physical warm-ups and their experiences and observations gleaned from over 15 years of coaching and competitive experience in intercollegiate forensics. The protocol design included three warm-up exercises based on the tested benefits of voice pedagogy (Tedesco & Patterson, 2015), each with a specific focus in mind. The first warm-up, called "the shakedown," targeted students' bodily movements: engaging the students to move all of their limbs to loosen and warm-up their bodies. Each student counted out to eight on each limb and then reduced the number of counts by half and repeated the sequence a second time with a quicker rate and higher energy. The second exercise utilized a combination approach to engage vocal cords and facial muscles. This exercise, called "the presidents," focused on constriction and expansion of facial muscles as well as pitch fluctuation from a normal range to a higher one. During the second exercise, the students recited the phrase, "Richard Nixon, Richard Nixon, Jimmy Carter, Jimmy Carter." When saying "Richard Nixon," students constricted their faces, like a scrunch, as they said the name. When students said the second half, "Jimmy Carter," they expanded their facial muscles and utilized a higher pitch. The third exercise focused on pitch, articulation, and diction; this exercise, "the alphabet," emphasized the individual pronunciation of each letter of the alphabet to gain an understanding of the sound and feel of each letter.

The graduate teaching assistants were trained during an hour-long session embedded into their existing two-week long instructor training at the start of the academic year. The graduate teaching assistants of the sections included in the experimental group all received training from the institution's Director of Forensics on how to implement the intervention technique. The training provided an overview of why the exercises were selected, a detailed demonstration on how to execute each exercise, as well as an opportunity for the graduate teaching assistants to participate in the activities. In training, the Director of Forensics emphasized the importance of instructor enthusiasm while implementing the warm-up exercises. Graduate teaching assistants were also provided with an instruction guide and given contact information for the Director of Forensics if they desired further training.

Instrumentation

McCroskey's (1970) Personal Report of Public Speaking Anxiety (PRPSA) was used for numerical analysis and pre-test/post-test comparison. The questions on the PRPSA are written on a 5-point Likert-type scale, one being "strongly agree" and five being "strongly disagree," indicating how well each statement applies to the participant. This questionnaire consists of 34 statements that measure speech-related anxiety levels. Each statement describes a personal characteristic such as "I have no fear of giving a speech." The results indicate whether the person has high (131 and above), moderate (98-130), or low anxiety (below 98). McCroskey (1970) stated that the average citizen of the United States has a score of 114.6, which indicates a level of

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anxiety that lies within the moderate range. The PRPSA scale has proven to be highly reliable (Smith & Frymier, 2006). The reliability for PRPSA in the current study was $\alpha = .96$ initial course and $\alpha = .95$ post-course.

Results

To reduce the familywise error rate, a mixed-design ANOVA was conducted. This split-plot design was used to determine whether students' perceptions of their public speaking anxiety changed throughout the semester's duration for students who engaged in warm-up activities (treatment group) before speech delivery and for students who did not participate in warm-up activities (control group).

Table 1

Table of Means and Standard Deviations for PSA

	Control Group ($n = 120$)		Treatment Group ($n = 145$)	
	Pretest $M (SD)$	Posttest $M (SD)$	Pretest $M (SD)$	Posttest $M (SD)$
PSA	119.65 (21.39)	99.67 (21.98)	121.89 (24.53)	100.60 (22.01)

A 2 x 2 mixed-design ANOVA was calculated to examine the effect of using warm-ups and time (pretest and post-test) on public speaking anxiety. A significant time x instructor interaction was not present $F(1,263) = .324, p > .05$. However, the main effect for time was significant $F(1, 263) = 319.09, p < .001$. The main effect for groups (control or treatment) was not significant $F(1, 263) = .389, p > .05$. Upon examination of the data, it appears that both the control and treatment groups experienced a similar decrease in public speaking anxiety over the semester. Table 1 provides means and standard deviations for public speaking anxiety in the control and treatment groups.

Discussion

This study assessed the impacts of adding systematically-planned and executed warm-up exercises to randomly-selected sections of a large, multi-section, standardized course. The course design—infused with elements of exposure therapy, cognitive modification, and skills training—

was established in previous empirical studies (sources redacted for peer review) as successful in reducing PSA. Graduate teaching assistants were trained to teach their students three specific physical and vocal warm-ups. They then led their classes in performing those exercises at the beginning of every speech day throughout the course.

The findings of this study affirmed the results of multiple previous studies demonstrating students' significant reduction in PSA at the end of the course as compared with their pretest PSA, hence affirming the effectiveness of an introductory speech course using a multidimensional design to mitigate PSA. The hypothesis predicted that students in the treatment group sections would demonstrate significantly greater PSA reduction than those in the control group sections. However, no significant difference between the two groups was established. Based on conventional wisdom and prior scholarship concerning the benefits of warm-ups in addition to previous literature regarding the positive, PSA-reducing impacts of speech warm-ups (Dwyer, 2000; 2012; Tedesco & Patterson, 2015), the lack of statistical significance was surprising. Nonetheless, because the warm-up protocol's execution did not have a negative impact on students' public speaking anxiety, other factors may have prevented a significant difference between the control and treatment groups.

The importance of and best practices for warm-ups before athletic exercise have been well documented, but "until quite recently, this belief was not well supported by empirical evidence, with coaches often resorting to a trial-and-error approach to design their athletes' warm-up strategies" (McGowan et al., 2015, p. 1524). This experience echoes that of the communication discipline, highlighting the importance of the reality that, in building a toolkit of best practices, findings that illustrate a lack of statistical significance can be of great importance.

Lack of statistically significant findings is not equivalent to proof of no effect, and non-significant findings are a vital part of the journey of scientific discovery. According to Blake McShane, a statistician at the Kellogg School of Management at Northwestern University, "All

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statistics naturally bounce around quite a lot from study to study" due to the natural variations in approach such as treatment method, participants, and measurement (Garcia-Navarro, 2019, para. 20). Dwyer (2000; 2012) and Tedesco and Patterson (2015) laid the groundwork for a scaffolding of scholarship using both observations and results from empirical studies. The findings of this study, although not significant, will guide the

next steps in the journey toward optimal, evidence-based best practices for warm-ups in the introductory speech course. The discussion below highlights the limitations that speak to the lack of significant findings, hence illuminating the next steps and opportunities for future research.

Limitations and Future Directions

This study employed a pre-test/post-test control group design using a measure of trait-like PSA [McCroskey's (1970) PRPSA]. Utilizing other instruments and measuring PSA on speech days may have yielded wholly different results, indicating more immediate or subtle changes. Recognizing that a warm-up exercise might not alter trait-like PSA, future warm-up intervention testing should employ a measure like the Spielberger State-Trait Anxiety Scale ([STAI], 1983), which measures transitory responses to temporary situations.

Our graduate teaching assistants may have differed in their attitudes toward and, therefore, in their delivery of the warm-up training, and ultimately, their execution of the warm-up exercises. If some teaching assistants bought into the benefits of the warm-up exercises more strongly than others, a variance in their impacts would likely occur. Additionally, since the warm-ups did not change over the semester, some students or instructors may have experienced malaise; this could have impacted the ways in which instructors led the warm-up exercises or how students perceived and reacted to them as the semester unfolded. An enthusiastic instructor who makes visible the benefits of warm-ups regularly would be more likely to tap into the benefits of cognitive modification along with the skills training treatment. However, an instructor who grows weary of or bored with what they are tasked to do in guiding student warm-ups could likely have a negative impact on students' attitudes of and experiences with warm-up exercises and their outcomes and, hence, their PSA. Future studies should test instructor buy-in as a potential mitigating factor and consider allowing instructors to choose which warm-ups are performed, or add new, rotating exercises throughout the semester based on student or instructor choice on a given speech day.

Triangulating the quantitative PSA measure with qualitative assessments of instructor buy-in and student attitudes toward warm-ups could generate more depth and richness in our capacity to determine the effectiveness of various warm-up exercises and the systematic employment of these warm-ups throughout the semester. Future studies should conduct instructor and student interviews or focus groups on determining warm-ups' effectiveness.

Like many studies of PSA reduction techniques, the current study employed a pre-test/post-test design at the beginning and end of a single semester of an introductory public speaking course. Scant research has established the long-term impacts of PSA reduction efforts. Adding evidence-based best practices as a tool to fortify an instructor toolkit approach could lead to more substantial long-term outcomes. Longitudinal studies would be required to establish whether specific treatments provide more powerful effects over time.

As discussed, the course examined in this study has already demonstrated significant PSA reduction for its students. The course design is already grounded in a combination of treatment modalities including skills training, cognitive modification, and exposure therapy, which scholars have established provides more substantial means of reducing PSA over any sole treatment method (Bedore, 1994; Bodie, 2010; Dwyer, 2000; Pribyl et al., 2001). As a part of a

broad, semester-long PSA-mitigation strategy, we couldn't isolate the treatment variable. Thus, a class environment that is not already infused with a plethora of treatments for reducing PSA might yield significant results by adding a protocol for warm-ups.

Additionally, combining warm-ups with cognitive modification through education about their benefits and a reflective element either after each speech or at the end of the semester may be needed to harness their potential positive impacts on relieving PSA. Dwyer (2000) and Bodie (2010) remind scholars of the individual nature of the PSA construct. The work of Dwyer (2000) reiterated the importance for students to select the treatment that works best to suit their needs to manage their speech anxiety. This study did not give students in the treatment group a choice to participate in the warm-up activities, which could have impacted the overall efficacy of the warm-up routine as an intervention technique.

Adding warm-ups as a part of a toolkit approach may provide more substantial impacts for some students, dependent on the dominant proximal causes and magnitude of their PSA. In contrast, other students may experience more significant PSA reduction due to adding visualization or a stronger focus on outlining skills. A reflective component could also provide a vital opportunity for instructors to perform formative assessment as the semester progresses. This assessment could help determine whether specific warm-ups are more beneficial than others or whether some exercises may be growing stale and need replacing. Additionally, if graduate teaching assistants are encouraged to participate in the choosing or creation of additional warm-up exercises, their involvement could enhance instructor buy-in and, by extension, their enthusiasm, and likelihood to encourage student reflection on the benefits of warm-up exercises.

Conclusion

To assess the impact of using warm-up exercises in the foundational public speaking course, we developed and tested a uniform warm-up protocol for students enrolled in our standardized, multi-section course. Similar to previous researchers' findings, we discovered that students in our course experienced a significant reduction in public speaking anxiety during the semester. However, we did not find a more profound difference in the mean levels of trait-like PSA reduction for students enrolled in sections that included the standard vocal and physical warm-up protocol we crafted and our GTA's employed on our students' speech delivery class days.

Our findings suggest that PSA treatment impacts may plateau despite creative interventions. Equally as plausible, however, is the likelihood that further assessment is needed to discern best practices for crafting, delivering, and testing warm-up exercises as a PSA mitigation technique. As McCroskey (2009) stated at the closure of his article *Communication Apprehension: What We Have Learned in the Last Four Decades*, "There never will be enough research on communication apprehension until the effects of high CA can be prevented for everyone in our society and in other cultures" (p. 169). Our data continue to show that students, like the general population, begin the introductory public speaking course with moderate to high levels of apprehension and benefit from continued focus on the treatment of PSA. Therefore, as our discipline continues to uncover and optimize means to mitigate PSA as an obstacle to

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students' success, especially given the heightened general anxiety of students in the introductory public speaking course, further assessments of techniques such as warm-up protocols remain merited.

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