Anticipatory Anxiety Patterns for Male and Female Public Speakers

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In previous research, physiological and psychological anxiety patterns have been established for public speakers. In a recent study (Behnke & Sawyer, 1999) reported state and trait patterns of anticipatory anxiety for public speakers for two weeks preceding the actual presentation. In the present study, gender differences in anticipatory state anxiety and narrowband trait anxiety patterns were investigated. Significant gender-based pattern differences were discovered with higher anxiety patterns reported by female speakers. Both female and male speaker groups exhibited the hypothesized quadratic v-shaped pattern of mean anxiety scores for the anticipatory period. Theoretical and pedagogical implications of the findings are discussed. **Keywords:** anticipatory anxiety, public speaking, gender differences, pattern analysis, anxiety treatment strategies.

In previous research, the physiological arousal of public speakers shows a quadratic pattern that peaks when subjects begin speaking (Behnke & Carlile, 1971). Carlile, Behnke and Kitchens (1977) found that state anxiety levels of public speakers decreased from the beginning of a public speech until the post-speaking period. In a recent study of psychological patterns of state anxiety, Sawyer and Behnke (1999) demonstrated a decelerating monotonic function for mean anxiety scores of speakers over the traditional periods of anticipation, confrontation, adaptation, and release peaking at anticipation. Finally, in a study of the patterns of anticipatory state anxiety of public speakers, it was discovered that the peak of anticipatory psychological tension occurred just before speaking (Behnke & Sawyer, 1999). In this study, three pre-performance milestones of anxiety were identified: (1) the moment when the public speech was assigned in class, (2) the mid-point of a laboratory session during which speeches were being prepared, and (3) the moment immediately preceding formal presentation of the speech to the class. For both state anxiety and narrowband trait anxiety, these events ordered themselves in a quadratic, v-shaped episodic pattern. The highest levels of anticipatory anxiety were found just before speaking, the second highest levels were associated with the time that the assignment was announced and explained, and the lowest level was found for the speech preparation period. Although the authors of this research alluded to the possibility of pattern differences by gender, the question was not investigated.

In their critique of sex difference research in communication, Canary and Hause (1993) argue that measurement shortcomings and inadequate operational definitions of key constructs have resulted in a paucity of meaningful findings by gender researchers. Behnke and Sawyer (1998) have proposed narrowband measures of anxiety as a strategy for simultaneously improving measurement precision and understanding the organization of traits and states through pattern analysis. Differ-

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ences in patterns, once detected, will enable investigators to construct typologies of anxiety syndromes for which efficacious treatment protocols could be developed and implemented. Therefore, it is the purpose of the present study to attempt to determine if differences in anticipatory anxiety exist between male and female public speakers for each of the milestones, or narrowband measures, of anticipatory anxiety described above.

Theoretical Perspective

The Neurobiology of Gender Differences

Physiological factors mediate each gender's response to stress (Strelau & Radomski, 1991). It is generally well-known, in the clinical domain, that post-adolescent females suffer a higher incidence of depression, than their male counterparts, (Nolen-Hoekesma & Girgus, 1994) as well as a higher incidence of anxiety disorders many of which are related to stressful events such as graded assignments (Matlin, 1996). Moreover, because of their genetic vulnerability to depression, women are prone to higher levels of depression-related anxiety than are men (Nolen-Hoeksema, 1987). Males are more resistant to the negative effects associated with prolonged periods and peak load moments of stress than their female counterparts (Newberry, Clark, Crawford, & Strelau, 1997). Moreover, females are more sensitive and more reactive to intense stimuli than males (Matczak, 1985). Consequently, greater reactivity to perceived stressors suggests higher state and trait anxiety levels for women as for men.

Following Beatty and McCroskey's (Beatty, McCroskey, & Heisel, 1998; McCroskey, 1997) communibiological perspective, differences in state anxiety levels appear to originate from neurological predispositions related to gender. Neurobiologists maintain that as the human species evolved, each gender adopted differentiated, yet complementary, survival strategies. According to Betzig, Mulder, and Turke (1988), males are more likely to confront while females adopt a more circumspect attitude toward new stimuli. Eventually, unique, gender-related neurological predispositions and structures emerged among humans (Gaulin, 1995). From the perspective of this biological model, gender differences on anxiety test scores reflect the innate temperamental differences between men and women (Feingold, 1994).

Recent studies in the cognitive neurosciences tend to support this view. Females have higher levels of neurochemicals linked to panic and anticipatory anxiety than their male counterparts (Hollander, Liebowitz, Choen, & Gorman, 1989). Blood flow increases in bilateral temporal poles are correlated with anticipated anxiety (Reiman, Fusselman, Fox, & Raichle, 1989) and high and low anxious females have been identified by their levels of striate-muscle activation in studies of electromyographic pattern analysis (Fridlund, Hatfield, Cottam, & Fowler, 1991). These authors suggest that their results indicate that anticipatory anxiety reflects activation more than immobilization or defense. Gray (1990) has identified specialized neurological circuits for inhibition and excitation processes. In addition to fight/flight reflexes, Gray has determined that suppressed behavioral responses to threat emanate from primitive regions of the human brain near the hippocampus while activation involves long term memory resources and higher cognitive functions as well. Previous research has confirmed the dual nature of speech anxiety, embracing both cognitive and physiological processes (Behnke & Beatty, 1981; Behnke & Beatty, 1991).

Cognitive Explanations of Anticipatory Anxiety

Several researchers have postulated the role of cognition and information processing in communication-related state and trait anxiety (Ayres, 1988; Behnke & Beatty, 1981; Greene & Sparks, 1983). Notably, Booth-Butterfield and Booth-Butterfield (1990) have examined the mediating effects of thought processes on speaker anticipatory and performance anxiety. They conclude that the role of cognition in state and trait anxiety helps explain the success of cognitive-based therapies for speech anxiety. Booth-Butterfield and Booth-Butterfield's contention is supported by studies in which modifying cognitions has beneficial effects on physiological as well as psychological symptoms of anxiety. For example, Hu and Romans-Kroll (1995) reported that positive imagery visualized immediately prior to a presentation reduced both the self-reported anxiety and cardiovascular responses to confrontation with audiences during a public speaking task.

The cognitive processes associated with anticipatory anxiety appear to follow Kahneman, Slovic, and Tversky's (1982) availability heuristic which holds that humans will estimate the likelihood of a negative event in direct proportion to the ease with which they can visualize examples of such events. Consequently, as an impending threat draws closer, humans will inflate the probability of occurrence of negative events. Because of its role in forming cause-effect associations in long-term memory, high levels of trait anxiety will further exacerbate the tendency to worry over personal shortcomings or overestimate the probability of disastrous outcomes. Low trait anxiety, conversely, is associated with less threat-related information in long term memory. As a result, low trait anxious individuals tend to focus on the specific features of the immediate threat and experience less generalized worrying (Butler & Mathews, 1987).

Applied to anticipatory anxiety, the availability heuristic predicts that as an assigned performance draws near, students will become increasingly concerned about performance evaluation. High trait anxious speakers will overestimate the downside risk in the assignment while low trait anxious speakers will focus on developing and executing strategies to successfully manage the assignment. Recent empirical studies bolster this prediction. For example, Daly, Vangelista, Neel, and Cavanaugh (1989) report that anticipatory state and trait anxiety impede the quality of speaking performance by creating distracting thoughts throughout the preparation process. Moreover, Motley (1990) observes that high trait anxious speakers frequently display over-concern for perfecting the details of a performance while low-trait anxious speakers generally strive for successful communication. Similarly, Ayres (1992) found a direct relationship between communication apprehension and negative thought patterns. Menzel and Carrell (1994) found that trait anxiety was related to total time spent in preparation for a public speech and that state anxiety was inversely related to performance quality. According to these researchers, preparing for a presentation was associated with lower levels of public speaking state anxiety. Bourhis and Allen (1996) found that communication trait anxiety negatively affects cognitive performance, generally, as well as speech preparation and performance in particular.

In related research on test anxiety, Martin (1997) found that the highest levels of anticipatory test anxiety occurred in the closest proximity to the test itself and that females reported higher anxiety levels than male counterparts as the examination period approached. In that report, the primary explanation for these gender

differences in anticipatory anxiety was that females assume a cautious rather than a confident presentation style in academic work. Such distinctions are important because anticipatory anxiety has been associated with other psychological perspectives and negative consequences (Cox & Swinson, 1994; MacLeod & Byrne, 1996; Poulton and Andrews, 1994).

Gender differences have been reported in studies of communication apprehension, interpersonal communication, and classroom behavior. Lustig and Andersen (1990), in their meta-analysis of empirical studies of communication apprehension, found that females generally report more communication anxiety than males. Likewise, gender differences in communication apprehension are reflected in classroom behavior at an early age. Petronio, Littlefield, and Martin (1984) suggest that because of the divergent sex roles imposed on each gender by society, females use a greater number of criteria than males when determining the level of self-disclosure. Interpreted from the vantage point of anticipatory anxiety research, females often exhibit more cautious and circumspect conversation strategies relative to males. In their national survey of middle school students, Daly, Kriesler, and Roghaar (1994), found significant differences in the comfort with which adolescent male and female students asked questions in class. Specifically, males enjoyed greater comfort, when asking questions during class discussions, than their female classmates. These investigators concluded that these differences were the result of self-esteem cognitions held by each gender during early teenage years.

Consequently, the following hypotheses are advanced:

H_1: Both male and female speaker groups will exhibit a quadratic, v-shaped pattern of mean anxiety scores for the episodes of anticipatory narrowband *trait* anxiety.

H_2: Both male and female speaker groups will exhibit a quadratic, v-shaped pattern of mean anxiety scores for the episodes of anticipatory *state* anxiety.

H_3: Female public speakers will exhibit a significantly higher episodic pattern of mean anxiety scores for both anticipatory narrowband *trait* anxiety, and anticipatory *state* anxiety, than their male counterparts.

Method

Study 1

Participants and Procedure. Participants in this study were 72 (36 male, 36 female) undergraduate students enrolled in a multi-section introductory college-level speech communication course. Spielberger's (Spielberger, Gorsuch and Luchene, 1970) STAI A-Trait anxiety scale was used to measure how speakers thought they "generally felt" during each of the three milestones, or significant events, of the anticipatory period (e.g., immediately subsequent to receiving a speaking assignment, during speech preparation in the laboratory session, and immediately before beginning to speak). Student responses were taken about mid-semester after speakers had delivered three 5 to 8 minute informative public speeches (about their travel experiences) in which they were exposed to the three milestones described above, to an audience of 20 fellow students.

Results. Alpha reliabilities for the narrowband trait scale were .92 for the announcement of the assignment, .93 for the preparation session, and .91 just before beginning to speak. Means and standard deviations for the trait anxiety milestones were computed separately for male and female speakers. For male speakers the means and standard deviations for the announcement of assignment, during preparation,

and immediately before delivery were 48.44 (11.09), 40.66 (11.98), and 53.86 (12.52) respectively. For female speakers the means and standard deviations for the same three milestones were 55.61 (10.29), 46.25 (11.27), and 60.78 (8.94) respectively. The results of an analysis of variance computed for the three milestones for male speakers shows a quadratic v-shaped pattern in the ordering of the STAI A-trait means [$F(2, 32) = 21.55$; $p < .05$]. Post hoc tests showed that, for the male speaker group, differences between milestones were significant. Specifically, Scheffé comparisons between the Announcement and Preparation Milestones, the Announcement and Immediately Before Delivery Milestones, and the Preparation and Immediately Before Delivery Milestones were, respectively, [$F(1, 33) = 7.43$ $p < .05$], [$F(1, 33) = 3.58$ $p < .05$], and [$F(1, 33) = 21.32$ $p < .05$]. In the case of male speakers, the highest trait anxiety level was for the episode immediately before speaking, the next highest was for the announcement of the assignment, and the lowest level was reported for the preparation. An analysis of variance was computed for female speakers across the three milestones. A quadratic v-shaped pattern in the ordering of means, like that of males, was found [$F(2, 32) = 32.97$; $p < .05$]. Post hoc tests showed that, for the female speaker group, mean anxiety score differences between the milestones were significant. Specifically, Scheffé comparisons between the Announcement and Preparation Milestones, the Announcement and Immediately Before Delivery Milestones, and the Preparation and Immediately Before Delivery Milestones were, respectively, [$F(1, 33) = 13.32$ $p < .05$], [$F(1, 33) = 4.06$ $p < .05$] [$F(1, 33) = 32.08$ $p < .05$]. The patterning of narrowband trait anxiety mean scores, for both male and female speakers, followed the quadratic, v-shaped, pattern expected under hypothesis 1.

Study 2

Participants and Procedure. Participants in this study were 40 (20 male, 20 female) undergraduate students enrolled in an introductory college-level speech communication course. Spielberger's (Spielberger, Gorsuch and Luchene, 1970) STAI A-State anxiety scale was used to measure how speaker's *actually felt* during each of the three milestones, or significant events, of the anticipatory period of a real performance (e.g., immediately subsequent to receiving the speaking assignment, during speech preparation in the laboratory session, and immediately before beginning to speak). These informative speeches were presented shortly after mid-semester, and after having presented several speeches, to an audience of 20 fellow students.

Results. Alpha reliabilities for the narrowband trait scale were .91 for the announcement of the assignment, .92 for the preparation session, and .92 for the moment just before beginning to speak. Means and standard deviations for the trait anxiety milestones were computed separately for male and female speakers. For male speakers the means and standard deviations for the announcement of assignment, during preparation, and immediately before delivery milestones were 56.35 (9.27), 42.65 (13.44), and 63.45 (5.67) respectively. For female speakers the means and standard deviations for the same three milestones were 62.65 (8.31), 51.01 (11.58), and 69.20 (6.36) respectively. The results of an analysis of variance computed on state anxiety mean scores for the three milestones for male speakers reveals a quadratic v-shaped pattern in the ordering of the means similar to the trait pattern reported in Study 1 [$F(2, 16) = 21.7$; $p < .05$]. Post hoc tests showed that, for the male speaker group, differences between milestones were significant. Specifically,

Scheffé comparisons between the Announcement and Preparation Milestones, the Announcement and Immediately Before Delivery Milestones, and the Preparation and Immediately Before Delivery Milestones were, respectively, [$F(1, 17) = 9.11$ $p < .05$], [$F(1, 17) = 6.49$ $p < .05$], [$F(1, 17) = 20.99$ $p < .05$]. An analysis of variance computed on female speakers across the state anxiety mean scores for the three milestones shows a quadratic v-shaped pattern in the ordering of means like that of males [$F(2, 16) = 19.08$; $p < .05$]. Post hoc tests showed that, for the female speaker group, all differences between milestones were significant. Specifically, Scheffé comparisons between the Announcement and Preparation Milestones, the Announcement and Immediately Before Delivery Milestones, and the Preparation and Immediately Before Delivery Milestones were, respectively, [$F(1, 17) = 7.77$ $p < .05$], [$F(1, 17) = 5.98$ $p < .05$] [$F(1, 17) = 18.55$ $p < .05$]. The patterning of these means, for both male and female speakers, followed the quadratic, v-shaped, pattern expected under hypothesis 2.

Comparing Patterns and Magnitudes of Studies 1 and 2

For both state and trait anxiety, the episodic anticipatory patterns, of both male and female speaker groups, exhibited the anticipated quadratic, v-shaped pattern. Hypothesis 3, however, suggests differences in *magnitude* rather than shape between the anticipatory anxiety milestone mean scores for male and female speaker groups.

Female speakers were expected to exhibit a significantly higher episodic pattern, for both anticipatory narrowband trait anxiety and anticipatory state anxiety measures, than their male counterparts. For trait anxiety, female means and standard deviations were 55.61 (10.29), 46.25 (11.27), and 60.78 (8.94) across the three anticipatory anxiety milestones while the male speaking group's means and standard deviation scores were 48.44 (11.09), 40.66 (11.98), 53.86 (12.52) respectively. Scheffé tests showed that female speakers had significantly higher mean trait anxiety scores than male speakers for the Announcement of Assignment Milestone [$F(1, 72) = 8.08$, $p < .05$], Preparation Milestone [$F(1, 72) = 5.47$, $p < .05$], and Immediately Before Delivery Milestone [$F(1, 72) = 5.11$, $p < .05$]. For state anxiety, female means and standard deviations were 62.65 (8.31), 51.01 (11.58), and 69.20 (6.36) across the three anticipatory anxiety milestones while the male speaking group's means and standard deviation scores were 56.35 (9.27), 42.65 (13.44), 63.45 (5.67) respectively. Scheffé tests again showed that female speakers had significantly higher trait anxiety scores than male speakers for the Announcement of Assignment Milestone [$F(1, 37) = 5.12$, $p < .05$], the Preparation Milestone [$F(1, 37) = 4.43$, $p < .05$], and the Immediately Before Delivery Milestone [$F(1, 37) = 8.49$, $p < .05$]. These findings support hypothesis 3.

Conclusions

In the present study, narrowband trait and state anxiety patterns differed according to sex, a finding expected from previous anticipatory anxiety studies and explainable from the emerging communibiological perspective. Male and female public speakers both exhibit the same quadratic, v-shaped pattern of anticipatory anxiety over the three milestones, or significant events of the anticipatory period, for both state and narrowband trait anxiety measures. However, as predicted, female public speakers exhibit higher levels of anxiety for each milestone on both state and narrowband trait measures. Future studies of gender differences in anxiety patterns

should apply and extend the field's current understanding of biology-based theories and constructs, especially those derived from neurophysiological explanations of emotion.

These findings are consistent with the anticipatory test anxiety findings of Martin (1997) in whose study, females reported higher anxiety levels than males as the examination period approached. Female anticipatory anxiety level differences may result from the adoption of a more cautious presentational style in public speaking than male speakers who exhibit what Martin (1997) calls a more confident presentational style. Roberts and Nolen-Hoeksema (1994) have shown that when encountering potential negative evaluation of their academic work, female students are more likely than males to experience a reduction in their levels of confidence. Since this presentational style difference between males and females has been found in other academic performance situations, it seemed reasonable to presume that similar results would be found for anticipatory state and narrowband trait anxiety for public speakers. Both situations are found in a public speaking academic context and both are known to elicit high anxiety levels.

Martin (1997) suggests that students with high anticipatory anxiety probably need more adequate instructional support using indirect measures to reduce anxiety levels and/or direct measures to enhance relevant presentational skills. It is interesting to note that, in this study, the lowest levels of both state and trait anxiety occur during the preparation milestone. Apparently, a classroom speech preparation laboratory assignment reduces anticipatory anxiety. On the other hand, the highest state and trait anxiety levels were found for the moment immediately preceding performance. This is a common finding in communication research. However, the relatively high levels of both state and trait anxiety at the moment the assignment is given suggests that the manner in which the assignment is described and developed is very important. Possibly a work period immediately following the announcement of the assignment would serve to further reduce the relatively high anxiety levels evoked by this milestone. Thorough descriptions of classroom speaking assignments, combined with in-class preparation sessions and practice speaking rounds, could ameliorate elevated anticipatory state anxiety by reducing uncertainty about the requirements of the performance.

Previously, Behnke and Sawyer (1999) recommended treating social anxiety with Gray's (1982; 1990) behavior therapy, in which speakers learn to perform more effectively following prolonged exposure to audiences. However, researchers have consistently reported that combining two or more anxiety reduction strategies produces greater efficacy than employing any method alone (Allen, Hunter, & Donohue, 1989; Hopf & Ayres, 1992). Developers of future public speaking anxiety treatment protocols should consider integrating visualization and/or systematic desensitization targeted to anticipatory anxiety milestones before using behavior therapy.

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