

Patterns of Psychological State Anxiety in Public Speaking as a Function of Anxiety Sensitivity

Ralph R. Behnke and Chris R. Sawyer

Previous empirical studies of anxiety patterns associated with public speaking performance have exhibited major differences between the psychological and physiological waveforms. Moreover, current research indicates that, in physiological studies of public speaking anxiety, several different patterns are embedded in the overall pattern, thereby demonstrating the importance of discovering the proper differentiated pattern for any given speaker. In the present study, the general psychological anxiety pattern for public speakers was examined in order to attempt to discover if independent, differentiated, patterns reside within the global pattern. A primary and a secondary pattern emerged. These sub-patterns are significantly different from one another at all major moments or milestones of the experience. In a second study, these patterns were identified by differing levels of anxiety sensitivity. Theoretical, pedagogical, and therapeutic implications of the findings are discussed.

KEY CONCEPTS public speaking, state anxiety, pattern analysis, narrow-band measures, anxiety sensitivity.

Ralph R. Behnke (Ph.D., University of Kansas, 1966) is a Professor in the Department of Speech Communication, Texas Christian University, Fort Worth, Texas, 76129. **Chris R. Sawyer** (Ph.D., University of North Texas, 1992) is an Assistant Professor, in the Department of Speech Communication, Texas Christian University, Fort Worth, Texas, 76129.

In early studies of psychological public speaking anxiety, researchers asked speakers to indicate how they felt after giving a speech (Behnke & Carlile, 1971). In responding to questionnaire items, the speakers' referent was the speech as a whole. Similarly, in early studies of physiological arousal associated with public speaking anxiety, arousal variables, such as elevated blood pressure immediately after the speech, were recorded (Dickens & Parker, 1951) again suggesting that such global post-performance measurements do represent total anxiety or a suitable form of summation of the anxiety producing elements of the presentation. In studies of this type, it is difficult to tell *when* the key moments of anxiety occurred for individuals or for groups.

As a result, researchers began to "unravel the ball of string" in an effort to

determine the major anxiety producing moments or events. In so doing, they took multiple measurements before, during, and after speaking in an effort to determine the pattern of psychological and physiological anxiety associated with the presentation of public speeches (Behnke & Beatty, 1981a, 1981b; Behnke & Carlile, 1971; Carlile, Behnke, & Kitchens, 1977; Clevenger, Motley, & Carlile, 1967). Interesting and useful pattern differences were found. One of the primary findings was that psychological anxiety peaks early in the anticipatory or pre-speaking period while physiological arousal, associated with speaking performance, peaks during confrontation, that is, the moment when speakers first stand before audiences and begin speaking.

Such differences in psychological and physiological anxiety patterns are of major interest in theory building and they provide useful insights for pedagogy and therapy. Researchers in a variety of social science disciplines, including communication, frequently follow a protocol of first establishing the overall or group-level pattern of a variable measured at different moments in time (Andrade & Singer, 1998; Davison, Gasser, & Shuai, 1996; Green, 1988). Subsequent analyses are employed to tease out component patterns that exist within the overall one. The ultimate goal of this research strategy is to identify new categories or sub groups so that clinicians and educators can more accurately diagnose and treat these conditions. Recently, scholars have advanced the neurological bases for several interconnected anxiety mechanisms (Wilken, Smith, Tola, & Mann, 1999). Although related to the same psychological state, the timing of these anxiety circuits is not the same thereby suggesting the possibility of differential state anxiety patterns within the overall decelerating monotonic function across public speaking milestones.

THEORETICAL PERSPECTIVE

Arousal Styles during Public Speaking

In a strong program of anxiety research at the University of Jyväskylä in Finland, Porhola (1999) sought to differentiate specific types of arousal (heart rate) from the general arousal pattern for anticipation, confrontation, adaptation, and release usually associated with public speaking anxiety. Her rationale is as follows:

Although a considerable amount of variance in heart rate responses between individual speakers has been reported in previous studies...this variance has not received much attention in speech communication research. A systematic examination of different arousal styles has not yet been attempted. However, a close examination of individual variance in HR responses could deepen our knowledge of the causes and consequences of different communication orientations (p.2).

The results of the Porhola (1999) study produced four differentiated arousal styles (patterns) during public speaking that were embedded in the general pattern. They were labeled the confrontation style, the inflexible style, the average style, and the insensitive style and all styles were related to public speaking outcomes. The average style was optimal for successful performance. Similarly, the overall psychological pattern of public speaking anxiety should also be dissected in order to determine if separate patterns are commingled in the generalized pattern.

Comparator Theory and Differential Patterns

From a biological perspective, survivability is contingent on the effectiveness with which a species adapts to environmental stress. Gray and his collaborators (Blanchard & Blanchard, 1990a, 1990b, 1996; Gray 1982, 1995, 1999; Gray & McNaughton, 1996, 2000) have identified neural circuits that enable humans to manage threats successfully across a variety of situations. These include a behavioral approach system (BAS) that guides an organism toward achieving desired goals and a behavior inhibition system (BIS) that moderates goal directed behavior when a threat is detected. BAS and BIS responses are mutually extinguishing, that is, the presence of one suggests the absence of the other. Taken together, however, BAS and BIS circuitry form the basis for both appetitive and aversive responses in humans.

As described by Gray, each circuit is functionally and anatomically unique. Brain lesions on the BIS reduce anxiety reactions such as heart rate acceleration, vigilance, and escape. Anxiety reducing drugs, such as ethanol, produce similar effects on the BIS, as do lesions. While precise neurological descriptions of the BAS and BIS are contained in his writings¹, the overall sophistication of primates and, especially, humans has prompted Gray's development of and increasing reliance on information-processing explanations of how these sub-systems interact.

According to Gray (1982, 1995), a specialized neurological circuit called the *comparator* predicts the probability of future reinforcement conditions based, in part, on signs of punishment and reward detected in the environment. The comparator responds to mismatch between actual conditions and those expected by the individual. Sensitivities to reward and punishment establish a threshold mechanism that determines both the direction and intensity of the mismatch. Within this framework, once a mismatch is detected, the comparator triggers a series of neurological events that provide the basis of anxiety reactions. Specifically, if increased threat levels are detected, the comparator transfers control of motor responses to the BIS, resulting in heightened vigilance, cautious approach strategies, and priming of physiological reactions including elevated heart rate. Conversely, decreasing threat conditions will be interpreted as either positive reinforcement or non-punishment (Gray, 1995). As a result, the comparator switches control to the BAS, which promotes energetic and extroverted behavioral responses. In summary, psychological anxiety is identified with activity in the BIS, while impulsiveness is a function of the BAS.

The comparator's moment-by-moment vigilance, especially during volatile situations, supports the notion of differential patterns of state anxiety. Gray and McNaughton (2000) describe two distinct pattern phenomena. In the first, the organism anticipates a high level of potential threat and encounters the stimulus with the BIS already engaged. If the level of threat decreases during exposure, the comparator will shift control from the BIS to the BAS causing psychological state anxiety to diminish, a process called *habituation*. In the second case, the organism enters the encounter with the BAS engaged but senses a higher level of threat than anticipated. Consequently, this disparity between expected and actual threat levels causes a precipitous rise in psychological anxiety during the confrontation stage. Accordingly, a *sensitization* effect will color the level of anxiety during the remainder of the situation, even if punishment does not ensue. Thus, according to Gray, the comparator accounts for two state anxiety patterns, one characterized by habituation, the other a function of sensitization.

Based upon the preceding discussion and the existing anxiety pattern research the

following research question is advanced:

RQ1: Does public speaking produce differentiated state anxiety patterns?

STUDY ONE

Subjects

Participants in this study were 146 (70 male, 76 female) undergraduate students between 18 and 25 years of age, enrolled in a required college-level basic speech communication course.

Procedures

Each student presented a five minute informative speech about a favorite city to a class of 24 to 30 fellow classmates and the course instructor. Speeches were performed for class credit and were graded. Speaking order and day of presentation were randomly assigned. After speaking, subjects filled out the Spielberger State Anxiety Scale (Spielberger, Gorsuch, & Lushene, 1970) (STAI) referring to each of the four periods generally addressed in speech anxiety studies: (1) anticipation (one minute before the speech), (2) confrontation (the first minute of the speech), (3) adaptation (the last minute of the speech), and (4) release (the minute immediately following the speech). The four scales were presented in random order for each speaker.

Instruments

The A-State portion of the STAI inventory (Spielberger, Gorsuch, & Lushene, 1970) used to measure state anxiety in this study is commonly employed in communication research to measure anxiety associated with a narrow-banded, specific event. This measurement strategy was used for each of the four "milestones" or periods of the total speaking experience as outlined by Behnke & Sawyer (1998). For example, when responding to the anticipation stage measure, subjects were instructed to indicate how they felt one minute before presenting their informative speeches. Alpha reliabilities for the four state anxiety measures were .90 for anticipation, .92 for confrontation, .91 for adaptation, and .90 for release.

The STAI (A-State) measures transitory emotional responses to specific situations (Spielberger, 1983). Moreover, in studies of public speaking state anxiety (Beatty, 1988; Beatty & Andriate, 1985; Beatty & Behnke, 1980; Beatty & Behnke, 1991; Behnke, Beatty, & Kitchens, 1978; Behnke & Carlile, 1971) the STAI (A-State) has evidenced consistently high levels of reliability and has performed according to theoretical expectations in previous patterns research (Behnke & Sawyer, 2000; Sawyer & Behnke, 1999).

Pattern Detection

Subjects were classified according to state anxiety pattern type by inspection of the line plot of STAI (A-state) scores across the four stages of public speaking anxiety. Of the 146 subjects who participated in the study, 112 or 76.7% exhibited the habituation (monotonic decelerating) pattern and 34 or 23.3% exhibited the sensitization (quadratic inverted v-shaped) pattern. A repeated-measures analysis of variance was used to assess the differences in means for state anxiety across the four public speaking milestones for habituation and sensitization patterns subjects.

Results

The results of the analysis of variance computed across the four periods for all subjects shows, overall, a decelerating monotonic ordering of the STAI (A-state) means for the four periods ($F_{3,145}=178.89$; $p<.05$). Scheffé tests detected significant differences between means for all comparisons. These findings are consistent with previous studies of state anxiety patterns for public speaking (Sawyer & Behnke, 1999).

Means and standard deviations were computed separately for habituators (monotonic decelerating) and sensitizers (quadratic inverted v-shape) and appear in Table 1. The results for an analysis of variance computed on state anxiety mean scores across the four stages of public speaking anxiety reveals a monotonic decelerating function [$F_{3,111}=114.11$; $p<.05$]. Post hoc tests showed that, for the habituator group, differences between stages of public speaking anxiety were significant. The results of an analysis of variance computed on state anxiety mean scores for the four stages of public speaking anxiety for sensitizers reveals a quadratic v-shaped pattern in the ordering of the means ($F_{3,33}=36.18$; $p<.05$). Post hoc tests showed that, for the sensitizer group, differences between stages of public speaking anxiety were significant. Post hoc test results for both habituators and sensitizers are reported in Table 2.

TABLE 1.
Means and Standard Deviations for Stages of Public Speaking State Anxiety.

	Descriptive Statistics	
	Mean	Standard Deviations
Combined for Both Pattern Types		
Anticipation Stage	60.64	14.83
Confrontation Stage	55.68	17.23
Adaptation Stage	43.83	15.53
Release Stage	33.62	12.40
Habituators (Monotonic Decelerating)		
Anticipation Stage	64.89	12.52
Confrontation Stage	51.42	16.27
Adaptation Stage	39.96	13.58
Release Stage	32.69	11.73
Sensitizers (Inverted v-shape)		
Anticipation Stage	46.65	13.37
Confrontation Stage	69.74	12.21
Adaptation Stage	56.59	14.87
Release Stage	36.71	14.14

Discussion of Study One

Communicative behavior frequently stems from the impetus of achieving desired personal goals balanced against the need to manage undesirable contingencies. Public speaking, for example, is a social tool for attaining benefits from others, including esteem, wealth, and power. Conversely, failure in public speaking can contribute to negative consequences as well. While giving students valuable opportunities to develop leadership skills and self-confidence, classroom speeches are also possible sources of embarrassment and criticism. Because the comparator is responsible for managing potential reward and punishment, Gray's theory of anxiety has found empirical support in recent communication studies (Freeman, Sawyer, & Behnke, 1997; Sawyer & Behnke, 1999).

In line with this perspective, pattern differences, over the four stages of speech anxiety, will depend on which circuit, BAS or BIS, dominates the subject's responses

TABLE 2.
Post Hoc Analysis of Differences between Stages of State Anxiety.

	Mean Diff.	Critical Diff.
Habituators (Monotonic Decelerating)		
Anticipation vs. Confrontation	13.47*	5.11
Anticipation vs. Adaptation	24.94*	5.11
Anticipation vs. Release	32.21*	5.11
Confrontation vs. Adaptation	11.46*	5.11
Confrontation vs. Release	18.73*	5.11
Adaptation vs. Release	7.27*	5.11
Sensitizers (Inverted v-shape)		
Anticipation vs. Confrontation	-23.09*	9.40
Anticipation vs. Adaptation	-9.94*	9.40
Anticipation vs. Release	9.93*	9.40
Confrontation vs. Adaptation	13.15*	9.40
Confrontation vs. Release	33.03*	9.40
Adaptation vs. Release	19.88*	9.40

Scheffé post hoc tests were used. * means $p < .05$

during the critical moments of anticipation and confrontation. High state anxiety during the anticipation stage tends to promote an overestimation of threat conditions while speaking. Because classroom public speeches are given in a relatively supportive environment, the majority of speakers become progressively acclimated to the speaking situation (Freeman, Sawyer, & Behnke, 1997). The resulting pattern for *habitulators*, is a monotonic decelerating function across the four stages of public speaking. This pattern has been found in previous state anxiety pattern research (Behnke & Sawyer, 1998, 1999, 2000; Sawyer & Behnke, 1999).

There is, however, evidence of a second pattern based on the comparator theory of speech anxiety. Initial confrontation with the audience has been described as the most *physically* stressful component of the state anxiety experience (Beatty & Behnke, 1991). Therefore, low state anxiety immediately preceding a speech indicates that sensitizers underestimate the threat level they will encounter when the speech begins. Consequently, these speakers become overwhelmed by the stress of audience confrontation resulting in increased state anxiety during confrontation. Although this sensitization effect will tend to moderate during the adaptation and release stages, overall state anxiety levels for sensitizers will tend to be higher than for their habituating counterparts. As a result, a quadratic inverted v-shaped pattern of anxiety over the four stages of anticipation, confrontation, adaptation, and release will describe the experiences of *sensitizers*.

Anxiety sensitivity (AS), or fear of fear symptoms, has been proposed as an explanation of the triggering mechanism for the BIS. According to Rolls (1990), an individual's emotional experiences reflect conditioning in previous social situations. Individuals who are genetically susceptible to punishment often experience heightened levels of distress when exposed to a threat (Schmidt, Storey, Greenberg, Santiago, Li, & Murphy, 2000). Repetition of these aversive experiences creates an expectation of negative consequences in similar situations (Taylor, 1995a, 1995b). With time, physical reactions relative to that stimulus become easily provoked and perceived as noxious. The tendency to over react during stress leads to higher levels of trait anxiety and an aversion to the physical symptoms of negative arousal.

Recent studies have established a direct relationship between AS and the perception of cardiovascular reactions during stressful situations (Van der Does, Anthony, & Barsky, 2000). In one study, for example, high AS subjects gave higher, and more accurate, estimates of their own heart rates than their low AS counterparts although the actual heart rates for both groups were nearly identical (Sturges & Goetsch, 1996). When combined with trait anxiety, AS has been linked to the development of panic disorder, for which the most prevalent physical symptom is elevated heart rate (Eifert, Zvolensky, Sorrell, Hopko, & Lejuez, 1999; Richards & Bertram, 2000). Previous scholars consistently report that the initial moment of a speech produces greater heart rate acceleration than any other before, during, or after the presentation (e.g., Behnke & Carlile, 1971). Consequently, AS has been associated with the first minute of public speaking (Mladenka, Sawyer, & Behnke, 1998). Taken together, these findings from previous research indicate that differing levels of AS typify each pattern of public speaking state anxiety.

Based on the findings of Study one and the preceding discussion of empirical studies, the following research question is proposed.

RQ2: Will sensitizers and habituators differ with respect to anxiety sensitivity?

STUDY TWO

Subjects

Participants in this study were 60 (30 male, 30 female) undergraduate students between the ages of 18 and 25 years of age enrolled in an introductory college public speaking course. Subjects were recruited for a study on public speaking effectiveness and participated voluntarily as one of several ways to fulfill a course requirement. All volunteers (N=180) were classified according to pattern type (138 habituators, 42 sensitizers) as described in the procedures section. Inclusion of subjects for this study followed stratified random selection procedures controlling for gender and pattern type.

Procedures

Each subject presented a five minute informative speech about a favorite hobby or leisure activity to a class of 24 to 30 fellow classmates and the course instructor. Speeches were performed for class credit and were graded. Speaking order and day of presentation were randomly assigned. After speaking, subjects filled out the Spielberger State Anxiety Scale (Spielberger, Gorsuch, & Lushene, 1970) (STAI) referring to each of the four periods generally addressed in speech anxiety studies: (1) anticipation (one minute before the speech), (2) confrontation (the first minute of the speech), (3) adaptation (the last minute of the speech), and (4) release (the minute immediately following the speech). The four scales were presented in random order for each speaker. Subjects were classified according to pattern type by inspection of the line plot of STAI (A-state) scores across the four stages of public speaking anxiety. Several weeks after the public speaking assignment, subjects completed Reiss, Peterson, Gursky, and McNally's (1986) Anxiety Sensitivity Inventory (ASI). An analysis of variance was used to assess the difference in mean ASI scores for habituation and sensitization pattern-type subjects.

Instruments

The A-State portion of the STAI inventory (Spielberger, Gorsuch, & Lushene, 1970) was administered for each of the four periods of the total speaking experience as outlined by Behnke & Sawyer (1998). For example, when responding to the confrontation stage measure, subjects were instructed to indicate how they felt during the first minute of their informative speeches. Alpha reliabilities for the four state anxiety measures were .91 for anticipation, .93 for confrontation, .90 for adaptation, and .92 for release.

Anxiety sensitivity was operationalized as scores on the ASI, an instrument commonly used to measure anxiety sensitivity on a variety of tasks (Peterson & Plehn, 1999). The ASI measures beliefs about aversive feelings or appearing anxious. In the present study, this scale yielded an alpha reliability of .85.

Results

Means and standard deviations for habituator and sensitizer ASI scores were 18.63 (7.89) and 28.1 (9.98), respectively. The results of the analysis of variance computed for pattern type shows that sensitizers had higher levels of anxiety sensitivity than habituators ($F_{1,58}=16.58$; $p<.05$). Scheffé tests detected significant differences between pattern types (mean difference=9.47, critical difference=4.65, $p<.05$). These findings are consistent with previous studies of state anxiety for public speaking (Mladenka, Sawyer, & Behnke, 1998).

CONCLUSIONS

Traditionally, communication scholars have presumed that speech anxiety is a unitary construct, that is, having a clearly explicated set of antecedent conditions, marker characteristics, and consequent effects. However, the findings of the current research, are consistent with those of recent vintage that support a contrary view. Specifically, state anxiety entails the operation of diffuse yet interrelated subsystems, each with its own characteristics and timing within any particular anxiety episode. In fact, speakers may appear both inhibited and innervated within a few seconds during the same presentation. Overarching patterns of psychological state anxiety are discernable from speaker reported state anxiety measures that are narrow-banded with respect to specific established public speaking milestones.

Previous research has revealed that the general pattern for psychological speech anxiety over the stages of anticipation, confrontation, adaptation, and release takes the shape of a decelerating monotonic function. Study one links the declining pattern with the process of habituation and suggests that this is the primary or dominant mode of response for those who actually present speeches in college classrooms. Based on the comparator theory of anxiety, habituators shift from BIS dominated reactions early in the speech to a greater reliance on BAS reactions during the later moments of the presentation. In conjunction with this finding, researchers should examine the degree of correspondence between this pattern of public speaking state anxiety and the level of behavioral indicators of the BIS, such as rigidity and disfluency, for each stage.

An inverted v-shaped pattern, similar to the one commonly reported for physiological (heart rate) patterns of public speaking anxiety, lends support for the heuristic concept which Gray (1995) calls the comparator. This sub-pattern, while representing only about 25% of the subjects in Study 1, warrants further investigation. Gray and McNaughton (2000) describe a similar inverted-v shaped pattern resulting

from procedures designed to sensitize subjects to fear-arousing stimuli. Given recent studies of sensitization effects during the speech preparation process (Behnke & Sawyer, 1999), the relative susceptibility of sensitizers and habituators to procrastinate should be investigated.

Anxiety sensitivity, which explained differences in habituator and sensitizer patterns in the current study, has been used as the basis for developing effective methods of treating anxiety. Behavior therapy, an anxiety reduction strategy based on the principle that proximity to a fear-arousing stimulus without punishment permits habituation to the stimulus and improved performance (Spielger & Guevremont, 1993), has been recommended as a remedy for AS (Taylor, Rabaian, & Federoff, 1999). Gray and McNaughton (2000) suggest combining cognitive therapies, such as systematic desensitization and visualization, with graduated exposure therapy to assist sensitizers in coping with stressful situations, such as public speaking. Requiring students to practice presentations first in front of small groups of students before speaking to the entire class, for example, follows the graduated exposure strategy. An advantage of behavior therapy is that communication educators may dovetail these procedures with skills training thereby augmenting conventional methods of anxiety reduction (Kelly & Keaten, 2000). Future researchers should examine the utility of integrating behavior therapies into traditional classroom assignments designed to promote skills acquisition.

NOTES

¹Summaries of Gray's program of research are available on-line at http://www.oup.co.uk/neuropsychol_anxiety/.

REFERENCES

- Andrade, D. F., & Singer, J. M. (1998). Profile analysis for randomized block experiments. *Journal of Applied Statistics*, 25, 237-244.
- Beatty, M. J. (1988). Situational and dispositional correlates of public speaking anxiety. *Communication Education*, 37, 28-39.
- Beatty, M. J., & Andriate, G. S. (1985). Communication apprehension and general anxiety in the prediction of public speaking anxiety. *Communication Quarterly*, 33, 174-184.
- Beatty, M. J., & Behnke, R. R. (1980). An assimilation theory perspective of communication apprehension. *Human Communication Research*, 6, 319-325.
- Beatty, M. J., & Behnke, R. R. (1991). Effects of public speaking trait anxiety and intensity of speaking task on heart rate during performance. *Human Communication Research*, 18, 147-176.
- Behnke, R. R., & Beatty, M. J. (1981a). A cognitive-physiological model of speech anxiety. *Communication Monographs*, 48, 158-163.
- Behnke, R. R., & Beatty, M. J. (1981b). A comparison of anticipatory and performance anxiety in public speaking. *Texas Speech Communication Journal*, 1, 3-6.
- Behnke, R. R., Beatty, M. J., & Kitchens, J. T. (1978). Cognitively-experienced speech anxiety as a predictor of trembling. *Western Journal of Speech Communication*, 42, 270-275.
- Behnke, R. R. & Carlile, L. (1971). Heart rate as an index of speech anxiety. *Speech Monographs*, 38, 65-69.
- Behnke, R. R., & Sawyer, C. R. (1998). Conceptualizing speech anxiety as a dynamic trait. *Southern Communication Journal*, 63, 160-168.
- Behnke, R. R., & Sawyer, C. R. (1999). Milestones of anticipatory public speaking anxiety. *Communication Education*, 48, 1-8.

Behnke, R. R., & Sawyer, C. R. (2000). Anticipatory anxiety patterns for male and female public speakers. *Communication Education, 49*, 187-195.

Blanchard, R. J., & Blanchard, D. C. (1990a). An ethnoexperimental analysis of defense, fear and anxiety. In N. McNaughton & G. Andrews (Eds.), *Anxiety*, (pp. 124-133). Dunedin, New Zealand: Otago University Press.

Blanchard, R. J., & Blanchard, D. C. (1990b). Anti-predator defense as models of animal fear and anxiety. In P. F. Brain, S. Parmigiani, R. J. Blanchard, & D. Mainardi (Eds.), *Fear and defence*, (pp. 89-108). New York: Harward Academic.

Blanchard, R. J., & Blanchard, D. C. (1996). Defensive quiescence to social stress: Relationships to other 'immobile' defenses. *Society for Neuroscience Abstracts, 22*, 1138.

Carlile, L., Behnke, R., & Kitchens, J. (1977). A psychological pattern of anxiety in public speaking. *Communication Quarterly, 25*, 44-46.

Clevenger, T, Motley, M, & Carlile, L. (1967). *Changes in heart rate during classroom public speaking*. Unpublished research report, University of Texas at Austin.

Davison, T. A., Gasser, M., & Shuai, D. (1996). Identifying major profile patterns in a population: An exploratory study of WAIS and GATB patterns. *Psychological Assessment, 8*, 26-31.

Dickens, M. & Parker, W. (1951). An experimental study of certain physiological, introspective and rating scale techniques for the measurement of stage fright. *Speech Monographs, 18*, 251-259.

Eifert, G. H., Zvolensky, M. J., Sorrell, J. T., Hopko, D. R., Lejuez, C. W. (1999). Predictors of self-reported anxiety and panic symptoms: An evaluation of anxiety sensitivity, suffocation fear, heart-focused anxiety, and breath-holding duration. *Journal of Psychopathology and Behavioral Assessment, 21*, 293-305.

Freeman, T., Sawyer, C. R., & Behnke, R. R. (1997). Behavioral inhibition and the attribution of public speaking state anxiety. *Communication Education, 46*, 175-187.

Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. Oxford, England, UK: Oxford University Press.

Gray, J. A. (1995). The contents of consciousness: A neuropsychological conjecture. *Behavioral and Brain Sciences, 18*, 659-676.

Gray, J. A. (1999). Cognition, emotion, conscious experience and the brain. In T. Dalgleish & M. Power (Eds.), *Handbook of cognition and emotion*, (pp. 83-102). New York: John Wiley.

Gray, J. A., McNaughton, N. (1996). The neuropsychology of anxiety: reprise. In D. A. Hope (Ed.), *Nebraska Symposium on Motivation, 1995: Perspectives on anxiety, panic, and fear. Current theory and research in motivation, Vol., 43.* (pp. 61-134). Lincoln, NE: University of Nebraska Press.

Gray, J. A., McNaughton, N. (2000). *The neuropsychology of anxiety: An enquiry into the function of the septo-hippocampal system*. Oxford, England, UK: Oxford University Press.

Green, D. M. (1988). *Profile analysis*. Oxford, England, UK: Oxford University Press.

Kelly, L., & Keaten, J. A. (2000). Treating communication anxiety: Implications of the communibiological paradigm. *Communication Education, 49*, 45-57.

Mladenka, J. D., Sawyer, C. R., Behnke, R. R. (1998). Anxiety sensitivity and speech trait anxiety as predictors of state anxiety during public speaking. *Communication Quarterly, 46*, 417-429.

Peterson, R. A., & Plehn, K. (1999). Measuring anxiety sensitivity. In S. Taylor (Ed.), *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety*, (pp. 61-81). Mahwah, NJ: Lawrence Erlbaum.

Porhola, M. (1999, November). *Arousal styles during public speaking*. Paper presented at the annual convention of the National Communication Association, Chicago, Illinois.

- Richards, J. C., & Bertram, S. (2000). Anxiety sensitivity, state and trait anxiety, and perception of change in sympathetic nervous system arousal. *Journal of Anxiety Disorders, 14*, 413-427.
- Reiss, S., Peterson, R. A., Gursky, D. M., & McNally, R. J. (1986). Anxiety sensitivity, anxiety frequency, and the prediction of fearfulness. *Behaviour Research and Therapy, 24*, 1-8.
- Sawyer, C. R., & Behnke, R. R. (1999). State anxiety patterns for public speaking and the behavior inhibition system. *Communication Reports, 12*, 33-41.
- Schmidt, N. B., Storey, J., Greenberg, B. D., Santiago, H. T., Li, Q., & Murphy, D. L. (2000). Evaluating gene x psychological risk factor effects in the pathogenesis of anxiety: A new model approach. *Journal of Abnormal Psychology, 109*, 308-320.
- Spiegler, M. D., & Guevremont, D. C. (1993). *Contemporary behavior therapy*. Pacific Grove, CA: Books/Cole
- Spielberger, C.D., Gorsuch, R.L., & Lushene, R.E. (1970). *Manual for the state-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Sturges, L. V., & Goetsch, V. L. (1996). Psychophysiological reactivity and heartbeat awareness in anxiety sensitivity. *Journal of Anxiety Disorders, 10*, 283-294.
- Taylor, S. (1995a). Anxiety sensitivity: Theoretical perspectives and recent findings. *Behaviour Research and Therapy, 33*, 243-258.
- Taylor, S. (1995b). Stimulus estimation and the overprediction of fear: A comment on two studies. *Behaviour Research and Therapy, 33*, 699-700.
- Taylor, S., Rabian, B., Fedoroff, I. C. (1999). Anxiety sensitivity: Progress, prospects, and challenges. In S. Taylor (Ed.), *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety*, (pp. 339-353). Mahwah, NJ: Lawrence Erlbaum
- Van der Does, A. J. W., Anthony, M. M., Ehlers, A., & Barsky, A. J. (2000). Heartbeat perception in panic disorder: A reanalysis. *Behaviour Research and Therapy, 38*, 47-62.
- Wilken, J., Smith, B. D., Tola, K., & Mann, M. (1999). Anxiety and arousal: Tests of a new six system model. *International Journal of Psychophysiology, 33*, 197-207.

Copyright of Communication Quarterly is the property of Eastern Communication Association and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.