

Disposition versus Situation:
Neurocommunicology and the Influence of Trait Apprehension versus Situational Factors
on State Public Speaking Anxiety

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Abstract

Research indicates that individuals with elevated levels of public speaking anxiety report significantly different mental representations of the public speaking context, when compared to individuals with lower levels of anxiety. To examine the effect of the differences in mental representations, narratives for three public speaking contexts were developed. Results indicated that disposition (i.e., trait apprehension) was a better predictor of state anxiety when giving an impromptu speech. Situational factors (i.e., importance, skills, impression), however, were better predictors of state anxiety when either giving a speech to a 5th grade class or giving a speech to friends.

Key Words: Neurocommunicology, communication apprehension, public speaking anxiety, trait and state anxiety

Introduction

Currently, among scholars who study communication fear and related constructs, there is much interest in and debate about the causes of communication avoidance and anxiety. The January 2000 edition of *Communication Education* provided a forum for an age-old debate in the social sciences, pitting nature against nurture. Researchers have argued over which global category, nature or nurture, explains more of the variation in individual differences. Although scholars agree that both nature and nurture influence emotional predisposition to some degree, the current debate focuses on which of the two is the prevalent cause (Beatty & McCroskey, 2000a, 2000b; Condit, 2000a, 2000b; McCroskey & Beatty, 2000).

Researchers adopting the nature paradigm assert that genetic inheritance explains the majority of the variation in individual differences associated with communication fear. Researchers adopting the nurture paradigm, in contrast, propose that anxious feelings associated with communication are primarily learned responses emerging from differing social environments. Others have attempted to reduce the dialectical tension between nature and nurture, asserting an interactional model in which both genes and social learning explain individual differences in communication fear. Because interactional models embrace both nature and nurture, the question as to which of the two causes prevails is not as important.

At first glance, it is difficult to find limitations with an interactional model—what other causes, besides genes and environment, could be responsible for individual differences in communication fear? A careful look at the question itself, however, reveals the limitation. Asking what

the causes or *inputs* are that determine the differences in communication fear overlooks the fact that our neurological processes serve *simultaneously* as *inputs, processes* and *outputs*.

Keaten (2001) offered an alternative conceptualization of communication fear, shifting attention away from *input-output* models and focusing instead on an *input-process-output* model that places neurological activity at the crossroads of genotype, environment, language, imagery, emotion and behavior. Condit (2000a) recommended that communication scholars “continue to develop paradigms and methods that operate at and integrate multiple levels of analysis from the individual to the social to the biological” (p. 23). To that end, Keaten’s (2001) neurological model of communication fear provides an integration of the individual, social and biological domains, functioning as a catalyst for future research.

To date, only one research study has tested the Neurocommunicology model (Keaten, Kelly & Borden, 2002). The study examined the semantic correlates and situational characteristics associated with the construct “public speaking.” Results indicated that people who reported elevated levels of communication apprehension associated “public speaking” with a lexicon that is qualitatively different from individuals with low levels of apprehension and reported semantic patterns that focus upon strong negative emotions, behavioral disruption and negative social evaluation (Keaten et al., 2002). Specifically, those with high CA were significantly more likely than those with low CA to use the following descriptors of public speaking: fear, nervous, panic, phobia, intimidating, scary, not fun, stress, hate, timidity, pressure, anxiety, frightening,

dread, horrific, helplessness, confusing, hard, tough, awful, pass out, sweating, blushing, hot, blackout, death, red, stuttering, shaking, crying, speechless, sick, weak, “um,” rambling, stomach, knuckles, embarrassment, dumb, looking unprepared, stupid, rejection, disaster, failure, fail, bad. In contrast, low apprehensives were significantly more likely to use terms including: articulation, loudness, eye contact, interesting stories, smile, eloquence, don't fidget, leadership, sincerity, MLK, Jr., JFK, clarity, skills, emphasis, expression, time, experience, punctuality, passion, persuasiveness, speaking, speech, group, podium, presentation, information, talking, lecture, conversation, questions, standing, knowledge, listening to others, communication, audience, people, crowds, listening, public, students, enjoyable, confidence, fun, passion, exciting, good, strength, bravery (Keaten et al., 2002). Furthermore, explanations of feelings differed substantively across levels of apprehension as did the situational characteristics associated with “public speaking.” High levels of apprehension were associated with an unfamiliar and unfriendly audience. Taken as a whole, these data suggest a distinct associative neural network model for individuals who report elevated levels associated with public speaking (Keaten et al., 2002).

The next section summarizes the neurocommunicology model. Due to space limitations, the summary is necessarily brief, but a full description of the model is available in the original paper (Keaten, 2001).

The Neurocommunicology Model

The neurocommunicology model of communication focuses on neurological processes, located at the intersection of genotype, emotion, language, imagery, and environment. The intent of the model is to offer a conceptualization of communication that is grounded in the biochemical systems and structural architecture that allow for interaction in a dynamic symbolic environment (Keaten, 2001). In this section we rely heavily on Keaten's (2001) description of the model.

Neurocommunicology refers to the study of how complex neurological processes produce, shape and limit communication behavior in a social, linguistic and physical environment. The preponderance of evidence upon which the model is built comes from several innovative technologies used to map neurological activity (e.g., computerized tomography, functional magnetic resonance imaging).

At conception, we inherit instructions for a vertical and phylogenetically structured brain. As biological processes unfold in a physical and social environment, a phenotype emerges. Part of our initial development involves the formation of neural

systems necessary for language acquisition, consisting of countless connections between cortical, limbic and subcortical regions. Language serves as a multifaceted social instrument, which functions to contain, categorize, contextualize and explain our dynamic environment. The complexity of human communication behavior reflects the intricacy of the neurological processes that produce it. In summary, communicative behavior is produced, shaped and limited by functional, integrated and adaptive neural systems.

Adopting a neurological model has many implications and provokes a host of new questions regarding the conceptualization, measurement, and treatment of communication fear (Keaten, 2001). The human experience of fear is unique because of neural pathways that connect eclectic sources of information, such as language, imagery, emotion and behavior. According to the model, linguistic behavior plays a central role in the understanding of negative emotion associated with communication. In specific, our language systems modify the experience of emotion through categorization and discourse related to emotion.

The fear of communication, according to the model, is categorically different than the fear experienced by other mammals because of neural networks that connect nonlinguistic information (i.e., sensorimotor imagery) to linguistic information (i.e., semantics, prosody, syntax, and discursive structures). Because of the synaptic web of emotional, connotative, discursive, and syntactical information conveyed during linguistic interaction, individuals will develop neural structures that predispose them to certain words, images, emotions and behaviors. For example, if a parent talks to a child using the semantic categorization of “public speaking,” while simultaneously exhibiting vocal signals of elevated arousal (prosody) and facial expressions symptomatic of fear, the child will build synaptic webs that link “public speaking” with elevated levels of limbic arousal.

Study Purpose and Research Questions

Prior research (Ayres, 1990; Beatty, 1988a, 1988c; Booth-Butterfield & Booth-Butterfield, 1986) has indicated that situational factors have explained a minor amount of variation in communication anxiety. Beatty, McCroskey, and Heisel (1998) stated: “Studies have demonstrated that factors in communication situations have only a small effect on state anxiety, while trait communication apprehension is highly predictive of state anxiety” (p. 205). This assertion may be questionable, however, because of the way in which public speaking anxiety was measured. In particular, respondents in prior research were asked to evaluate their feelings associated with public speaking *without any*

knowledge of the public speaking context, allowing for multiple and significantly different mental representations of the public speaking event.

A neurological model of communication fear suggests that communication contexts, such as dyads, groups, and public speeches are linguistic constructions that classify ambiguous sets of events (Keaten, 2001), which are subject to individual variation. Public speaking, for example, is not a monolithic social event. It is, rather, a semantic construction that serves to cluster a nebulous confluence of images, language, emotion and behavior. Research supports this assertion. Ayres and Heuett (1997), for example, found that high apprehensives differed from low apprehensives in their images of public speaking (measured by drawings). Their study demonstrated that high apprehensives pictured public speaking as more negative, less detailed, and envisioned themselves as possessing less control of the situation. Keaten et al. (2002) found that when highly apprehensive individuals imagine giving a speech they tend to view their audience as less familiar, less friendly, and less interested in the topic.

Current measures of public speaking anxiety (e.g., PRCA, PRPSA) are limited because they do not offer contextual information regarding the nature of the speech. This “contextual ambiguity” coupled with research evidence suggesting that people possess different images and thoughts depending on their apprehension levels (Ayres & Heuett, 1997; Keaten et al., 2002), suggests a confounding variable when assessing feelings toward public speaking.

Theories advancing temperament (e.g., genetic predisposition, see Beatty & McCroskey, 2000) do not take into account contextual variation in neurological representations of the linguistic construct of “public speaking.” The purpose of the current study, therefore, was to investigate the relationship between trait apprehension, situational factors and state apprehension *when contextual information is specified*. There are a number of aspects of the speech context that can vary such as audience characteristics, novelty of the situation, conspicuousness of the speaker and so forth (Daly & Buss, 1984). In the present study, we selected three contextual features: whether or not the speaker could prepare in advance (i.e., impromptu speech), the status of the audience relative to the speaker (i.e., much younger audience), and audience familiarity (i.e., speaking to a group of friends). Of course, what constitutes a low status audience, for example, depends on characteristics of the speaker such as his or her age, but for the purposes of this study we focused on the undergraduate student speaker. The following three research questions were advanced:

RQ₁: When giving an impromptu speech, which explains more of the variation in state anxiety—trait apprehension or situational factors?

RQ₂: When giving a speech to a group of 5th graders, which explains more of the variation in state anxiety—trait apprehension or situational factors?

RQ₃: When giving a speech to a group of friends, which explains more of the variation in state anxiety—trait apprehension or situational factors?

Method

Participants

One hundred and forty-five (145) students enrolled in an introductory level public speaking course at a large-sized metropolitan western university and a general education course at a midsized suburban university served as participants. The introductory level public speaking course is required of all undergraduate students and the general education course is open to all majors; therefore, the research sample contained an eclectic array of majors. Fifty six (56) percent of the participants were male and forty four (44) percent were female. The median age was 19 with the majority of participants (90%) falling in the 18-22 ranges.

Instruments

Personal Report of Communication Apprehension (PRCA-24). The PRCA-24 is a measure of trait-like communication apprehension (i.e., disposition), consisting of 24 statements regarding feelings toward communicating. Respondents are asked to rate their level of agreement with each statement using a five-point Likert format. The PRCA-24 was designed to assess feelings about communicating in four contexts: dyad, group discussion, meetings, and public speaking. The PRCA-24 is high in internal consistency and research data also support the content and criterion validity of the PRCA-24 (McCroskey, 1997). Alpha reliability obtained in this study was $\alpha = .96$.

Public Speaking Contexts: Three public speaking contexts were developed for the purposes of this study (see Appendix A) and focused on three contextual features. In the first situation, participants are placed into a public speaking class and required to give an impromptu speech, thus creating a context in which the speaker is unable to prepare in advance. The second situation was generated to create a context with a low status (and hence low threat) audience, having participants giving a speech to a group of 5th graders on a typical day in the life of a college student. The final situation involves the presenting of a speech to a group of good friends, producing a situation with high audience familiarity (see Appendix A). These contexts were designed to approximate plausible speaking situations that create varying demands on speakers.

State Anxiety (SA). The SA consisted of a set of 7 point semantic differential scales. Specifically, five items were listed using the concepts of anxiety, tension, nervousness, relaxation, and comfort. Internal reliability estimates for the three public speaking contexts were high: (1) impromptu speech, $\alpha = .91$, (2) speech to 5th graders, $\alpha = .89$, and (3) speech to friends, $\alpha = .96$.

Assessment of Situational Factors (ASF). The ASF consists of three items: (1) How important is making a positive impression (5 = extremely important to 1 = not that important)? (2) I possess the skills to communicate effectively in this situation (5 = strongly agree to 1 = strongly disagree), and (3) What type of impression do you think you would make in this situation (5 = excellent to 1 = poor)? Prior research shows that these factors are significant predictors of state communication apprehension (Ayres, 1997; Leary & Kowalski, 1995). ASF score was calculated using Ayres' (1997) guidelines, resulting in the following formula:

$$ASF = Importance\ score * (6 - skills\ score) * (6 - impression\ score)$$

ASF scores ranged from 1 to 125. A higher number indicates a higher likelihood of state anxiety. A score of 125, for example would be assigned when the participant: (1) views the situation as "extremely important" for making a positive impression, (2) strongly disagrees with the statement, "I possess the skills to communicate effectively in this situation," and (3) has the expectation that they would make a "poor" impression in the situation. In contrast, a score of 1 would be assigned if the participant rated the public speaking situation as "not that important," agreed strongly that they possess the skills to be effective, and expected that s/he would make an excellent impression. Because the ASF is a multiplicative function of three distinct dimensions (i.e., importance, skills, and impression), each measured by only one item, reliability estimates could not be calculated.

Procedure

Participants were given a packet with the three instruments on the first day of class during the spring semester of 2003. Participants started by filling out the PRCA-24. The next two pages described the three public speaking contexts. After the description of each situation, participants estimated their state anxiety and assessed the situational predictors (i.e., importance of a positive impression, possession of skills, and likely outcome). Participants were guaranteed confidentiality and were not required to participate.

Results

Data show that participants reported different levels of anxiety for each of the three public speaking situations, $\Lambda = .334$; $F(2, 140) =$

139.9, $p < .0001$). Specifically, participants reported that the impromptu speech was associated with the most anxiety ($M = 23.1$, $SD = 6.58$), followed by giving a speech to 5th graders ($M = 14.4$, $SD = 6.20$). Giving a speech to friends was rated, on average, as lowest in state anxiety ($M = 13.5$, $SD = 7.66$).

Table 1 lists means for the three situational predictors across each of the three public speaking contexts. Results show that students viewed the impromptu speech and 5th grade speech as more important (i.e., making a positive impression) than giving a speech to friends. Participants also were *less* likely to agree that they possess the necessary skills, and *less* likely to make a positive impression for an impromptu speech as compared to either giving a speech to 5th graders or giving a speech to friends (see Table 1).

RQ₁: When giving an impromptu speech, which explains more of the variation in state anxiety—trait apprehension or situational factors?

To address each of the research questions, a regression model was developed using trait apprehension and situational factors as independent variables and state apprehension as the dependent variable. The model indicated that when giving an impromptu speech trait apprehension (partial $r = .56$; $t = 8.09$, $p < .001$) was a better predictor of state anxiety than situational factors (partial $r = .31$; $t = 3.84$, $p < .001$). The two-factor model accounted for 53% (adjusted R^2) of the variance in state apprehension scores (see Table 2).

To explore the relationship between the three situational factors (IVs) and state anxiety (DV), an additional regression model was constructed. The model proved significant, $F(3, 141) = 30.6$, $p < .001$ and explained 38% of the variance in state anxiety scores. In examining the standardized beta coefficients for each component, the participant's estimate of the impression they would make was the best predictor of state anxiety (Beta = $-.364$, $t = -4.31$, $p < .001$), followed by possession of skills (Beta = $-.311$, $t = -3.67$, $p < .001$) with importance of making a positive impression being the weakest predictor (Beta = $.157$, $t = 3.40$, $p < .01$). The following predictive equation was generated through regression analysis:

$$State\ Anxiety = 38.79 + 1.04(Importance) - 2.65(Skills) - 3.11(Impression)$$

RQ₂: When giving a speech to a group of 5th graders, which explains more of the variation in state anxiety—trait apprehension or situational factors?

A regression model was developed for RQ₂ similar to RQ₁. The model proved to be statistically significant, $F(2, 138) = 28.02$, $p < .001$ and explained 28% of the variation in state anxiety scores (see Table 2). An examination of partial correlation coefficients revealed that situational factors were

better predictors of state anxiety (partial $r = .37$, $t = 4.64$, $p < .001$) than trait communication apprehension (partial $r = .32$, $t = 3.99$, $p < .001$) when giving a speech to a class of 5th grade students.

To examine the predictive weight of the three situational predictors of anxiety, a regression model was developed using the three predictors as independent variables and state anxiety when giving a speech to 5th graders as the dependent variable. The model was significant, $F(3, 138) = 29.85$, $p < .001$ and explained 22% of the variance in state anxiety. Standardized Beta coefficients revealed that the estimate of the impression made was the strongest predictor (Beta = $-.359$, $t = -3.49$, $p < .001$), followed by possession of skills (Beta = $-.202$, $t = -2.04$, $p < .03$) with importance of making a positive impression being the weakest predictor of state anxiety (Beta = $.141$, $t = 1.78$, $p < .05$). The analysis produced the following regression equation:

$$\text{State Anxiety} = 30.62 + 0.84(\text{Importance}) - 1.93(\text{Skills}) - 2.93(\text{Impression})$$

RQ₃: When giving a speech to a group of friends, which explains more of the variation in state anxiety—trait apprehension or situational factors?

A regression model was developed using trait anxiety and situational factors as IVs and state anxiety as the DV. The regression model proved significant, $F(2, 139) = 72.08$, $p < .001$ and explained 50% of the variation in state anxiety (see Table 2). Similar to RQ₂, partial correlations indicate that situational factors were a better predictor of state anxiety (partial $r = .60$, $t = 8.8$, $p < .001$) than trait anxiety (partial $r = .47$, $t = 6.2$, $p < .001$) when giving a speech to a group of good friends.

Examining the partial correlation coefficients for the situational factors, importance of making a positive impression (partial $r = .38$, $t = 4.89$, $p < .001$) and estimate of impression (partial $r = -.38$, $t = -4.87$, $p < .001$) were both strong predictors of state anxiety. Possession of skills was also a significant predictor of state anxiety (partial $r = -.24$, $t = -2.95$, $p < .01$). The three-factor model explained 40% of the variance in state anxiety and yielded the following regression equation:

$$\text{State Anxiety} = 35.6 + 2.00(\text{Importance}) - 2.80(\text{Skills}) - 4.31(\text{Impression})$$

Discussion

The study was conducted to attempt to answer an often-asked question: which is a better predictor of state anxiety when giving a public speech, disposition (i.e., trait apprehension) or situational factors (i.e., importance, skills, impression)? Data in this study suggest that the answer to the question depends on the public speaking context. When giving an impromptu speech, for example, trait apprehension was a better

predictor of state anxiety. When giving a speech to a group of fifth graders (a low status audience relative to the speaker), however, or giving a speech to a group of friends (a familiar audience), situational factors were better predictors of state anxiety.

Using the model of neurocommunication, a clear explanation of the findings can be advanced. “Public speaking” is a social construction rather than a physical reality. Communication contexts, such as group communication, interpersonal communication, etc. are linguistic constructions that classify an eclectic array of communication contexts, each with a myriad of potential behaviors. Measuring emotions associated with public speaking without supplying contextual information introduces a key confounding variable—individual differences in associative neural networks associated with public speaking (Keaten et al., 2002). The findings of this study indicate that specification of contextual features provides a more complete understanding of public speaking anxiety.

This study defined situational characteristics by using a composite of three factors: (1) importance of making a positive impression, (2) possession of skills needed to communicate effectively, and (3) estimation of the type of impression made. Across all three public speaking contexts, a person’s estimate of the impression s/he would make was the strongest predictor of state anxiety. This finding is consistent with previous research (Keaten & Kelly, 2000; Keaten, Kelly & Finch, 1999, 2000; Leary & Kowalski, 1995) that found that communication avoidance and anxiety problems, such as reticence, are strongly associated with high levels of fear of negative evaluation.

Possession of skills was also a strong predictor for giving an impromptu speech and giving a speech to 5th graders but was not as strong in the context of giving a speech to friends. The importance of making a positive impression was a weak predictor of state anxiety when giving an impromptu speech or giving a speech to 5th graders. When giving a speech to friends, however, importance of making a positive impression was a stronger predictor of state anxiety. In short, the situational factors, with the exception of the importance of making a positive impression, varied in their predictive power according to the public speaking context.

The present study is limited a number of ways. Only three public speaking contexts were studied. Furthermore, the features of each public speaking context (e.g., audience familiarity, audience similarity, degree of preparation, etc.) were not varied in a systematic way. In addition, participants’ experience with public speaking was not addressed, which may have confounded the results of this study.

In conclusion, adopting a neurological model has many implications and provokes a host of new questions regarding the conceptualization, measurement, and treatment of communication fear. The human experience of fear is unique because of neural pathways that connect eclectic sources of information, such as language, imagery, emotion and

behavior. We need to reveal the complex role that linguistic behavior plays in the experience of negative emotion associated with communication. One clear direction for future research is to explore how contextual variation influences communication anxiety, inhibition and avoidance.

Table 1
Descriptive Statistics for Situational Predictors of State Anxiety

Situational Predictor	Importance ¹		
	M	SD	N
Impromptu Speech to Public Speaking Class	3.71 ^a	1.00	145
Speech about College Life to 5 th Grade Students	3.90 ^b	1.04	143
Speech to a Group of Good Friends	3.03 ^{ab}	1.26	143
	Skills ²		
	M	SD	N
Impromptu Speech to Public Speaking Class	3.63 ^{ab}	.77	145
Speech about College Life to 5 th Grade Students	4.13 ^a	.65	143
Speech to a Group of Good Friends	4.22 ^b	.68	143
	Impression ³		
	M	SD	N
Impromptu Speech to Public Speaking Class	3.21 ^{ab}	.77	145
Speech about College Life to 5 th Grade Students	3.92 ^a	.76	143
Speech to a Group of Good Friends	3.81 ^b	.75	143

Means with the same superscript are significantly different ($p < .05$)

¹A higher number indicates greater importance.

²A higher number indicates stronger agreement concerning the possession of skills.

³A higher number indicates that a better impression would be made.

Table 2
Correlation Coefficients for Trait Apprehension and Situational Factors

Public Speaking Context	Trait Apprehension (controlling for situational factors)	Situational Factors (controlling for trait apprehension)	Explained Variance of Two Factor Model (Adjusted)
State Anxiety when Giving an Impromptu Speech to a College Class	.56	.31	53%
State Anxiety when Giving a Speech to 5 th Grade Students	.32	.37	28%
State Anxiety when Giving a Speech to a Group of Three Good Friends	.47	.60	50%

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Appendix A
Public Speaking Contexts

Situation One

Imagine yourself as a student in a basic public speaking course with 25 other students. Your first assignment is to give a three-minute “impromptu” speech. Today is the day of your speech. You are scheduled to speak first. The instructor calls your name and you get up from your desk and go to the front of the class. Your instructor hands you a slip of paper with your topic written on it. You then face the class to begin your speech. ***How would you feel in this situation? (Please circle)***

Situation Two

You have been asked by a friend to give a three-minute speech to a group of 25 fifth grade students on a typical day in the life of a college student. On the day of the presentation you meet your friend and say hello to the students. Your friend introduces you and then you stand in front of the fifth graders. ***How would you feel in this situation? (Please circle)***

Situation Three

You have been assigned a speech in one of your favorite classes. You have gathered appropriate information and have written your speech. You are scheduled to give your speech tomorrow. While you are rehearsing your speech, three good friends stop by and see that you are rehearsing. They ask to hear your speech. You agree and ask them to sit down. You put your note cards in order and then turn to face your friends. ***How would you feel in this situation? (Please circle)***