

GROWING A GROWTH MINDSET IN THE INTRODUCTORY COMMUNICATION
COURSE: DESIGN, PILOT TESTING, AND IMPLEMENTATION OF A
COMMUNICATION MINDSET INTERVENTION

by

Karin Nordin
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Committee:

_____ Director

_____ Department Chairperson

_____ Program Director

_____ Dean, College of Humanities
and Social Sciences

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Doctor of Philosophy at George Mason University

by

Karin Nordin
Master of Arts
University of Alabama, 2017
Bachelor of Arts
Gustavus Adolphus College, 2015

Director: Melissa Broeckelman-Post, Associate Professor
Department of Communication

Spring Semester 2021
George Mason University
Fairfax, VA

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DEDICATION

This is dedicated to Kris Kracht and Cadi Kadlecek, two people who instilled in me the foundations of growth mindset and fundamentally changed the trajectory of my life for the better.

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LIST OF ABBREVIATIONS

Communication Mindset.....	CM
Communication Apprehension	CA
Public Speaking Anxiety.....	PSA

ABSTRACT

GROWING A GROWTH MINDSET IN THE INTRODUCTORY COMMUNICATION COURSE: DESIGN, PILOT TESTING, AND IMPLEMENTATION OF A COMMUNICATION MINDSET INTERVENTION

Karin Nordin, Ph.D.

George Mason University, 2021

Dissertation Director: Dr. Melissa Broeckelman-Post

This dissertation describes the formative research, development, pilot testing and main test of a communication mindset intervention. Built on theoretical foundations in educational psychology, communication education, and instructional communication, this work extends Carol Dweck's original work on Mindset Theory into the social domain. Three studies are included. In study one, the communication mindset intervention was developed and tested, and results showed the mindset of students in the activity condition improved after exposure. In study two, the intervention was tested as part of an introductory communication course, and both the activity and video intervention resulted in improved outcomes. Finally, in study three, structural equation modeling was used to examine the ways mindset and other variables impacted engagement and subsequently performance in the introductory communication course. Theoretical implications and practical application are discussed.

CH. 1: INTRODUCTION

In 2018, the total undergraduate enrollment in America was predicted to reach over 17.2 million students before 2028 (Hussar & Bailey, 2018). With the long-term impacts of COVID-19 calling that number into question and causing widespread budget scarcity (Gardner, 2020), it becomes even more urgent for communication departments to situate themselves as an integral part of an undergraduate education. Currently, an estimated 80% college require an introductory communication course as part of the general education curriculum (Morreale et al., 2016). This represents an increase which has slowly occurred over the past 10 years, as more employers start to recognize the importance of high-level communication skills and demand those skills in future employees (Hart, 2018). The 2016 Bloomberg Job Skills report listed communication skills one of the most desired, yet least common skill sets that recruiters are seeking (Levy & Cannon, 2016). Even before COVID-19 started, the 2019 Future Skills report was generated to name the top 14 skills that would be necessary in an increasingly digital world (Ehlers & Kellermann, 2019). Communication competence specifically (one of the core competencies of the introductory course; Hooker & Simonds, 2015) was named one of the top 14 necessary competencies future workers will need.

For a majority of students, a single semester of the introductory course will be the only exposure to formal training in communication they will receive during their

undergraduate career (Morreale et al., 2016). Yet, it may be one of the most impactful. From improved academic performance (Horton, 2015) to better first year retention rates (McKenna-Buchanan et al., 2020), students who enroll in an introductory communication course typically see more academic success than their non-enrolled counterparts. Taking an introductory communication course has been shown to improve overall academic motivation (Sidelinger & Frisby, 2019), increase self-perceived communication competence (Broeckelman-Post et al., 2020; Suwintattichaiyorn & Broeckelman-Post, 2016), public speaking competence (Dwyer & Fus, 2002), and communication self-efficacy (Dwyer & Fus, 2002; Nordin & Broeckelman-Post, 2019; Strawser et al., 2017), as well as reduce public speaking anxiety (Broeckelman-Post & Pyle, 2017; Hunter et al., 2014; Nordin & Broeckelman-Post, 2019; Strawser et al., 2017).

One newer area of research showing promise is the role of a student's communication mindset. Mindset Theory (Dweck, 2006; Dweck et al., 1995) describes the underlying beliefs individuals have regarding the stability of personality traits. Those with a "fixed mindset" may believe these traits (such as intelligence or morality) are an innate ability that is resistant to change (Dweck, 2006). On the contrary, others see these traits as a result of learning and hard work, holding what Dweck has dubbed a "growth mindset" (Dweck, 2006). An individual's mindset has the most impact in academically stressful situations (Yeager & Dweck, 2012), such as the introductory communication course. It is no surprise, then, that a growth mindset which is domain-specific to communication is related to higher speech grades and lower public speaking anxiety, as

well as predictive of student engagement within the introductory course (Nordin & Broeckelman-Post, 2019; Stewart et al., 2019).

While research on communication mindset is promising, it has also brought to light some problems. In two separate studies, students' mindset towards communication remained stable after one semester of the introductory course (Nordin & Broeckelman-Post, 2020; Stewart et al., 2019). This finding follows the majority of existing mindset research, which typically shows mindset is a trait variable that remains stagnant (Dweck et al., 1995; Dweck & Leggett, 1988). However, there is one notable exception. Scholars have designed specific interventions which successfully push students towards a growth mindset (Blackwell et al., 2007; Paunesku et al., 2015; Schmidt et al., 2015; Yeager et al., 2016). If communication growth mindset is indeed related to both reduced public speaking anxiety and increased student engagement (Nordin & Broeckelman-Post, 2019), the introductory course should ideally be functioning in a way that improves that mindset. Thus, there is a clear need for the development of a communication mindset intervention that could be implemented within the introductory course curriculum.

The aim of this dissertation is to respond to this need, as well as develop a better understanding of the role of communication mindset plays in introductory course learning and performance. I approached this goal through four main stages. First, I followed the philosophy of user-centered design thinking (Brown, 1992; Yeager et al., 2016) and conducted formative interviews with introductory course students in order to inform the content of the communication mindset intervention. Following previous mindset intervention research (Blackwell et al., 2007; Paunesku et al., 2015; Yeager et al., 2016),

I created a text, video, and activity version of the same intervention message. These versions were piloted and then integrated into the introductory course as a research credit available to all students. Finally, I used structural equation modeling to examine the role mindset plays within the introductory course and the relationship between mindset and critical communication variables, as well as student engagement and course grades.

This manuscript begins with a deep dive into the many theories that supported and informed the dissertation as a whole. Following this deeper literature review, each chapter represents one single, publication-ready study. These individual studies each build on the one before, and are complete with the literature review, method section, results and discussion that would be necessary for the study to be published as an individual piece of work. Finally, the last chapter discusses the findings of these studies together in context and offers broader implications for the ways this work can benefit the various domains of research to which it belongs.

CH. 2: THEORY

A theory is an “abstract system of concepts with indications of the relationships amount these concepts, that help us to understand a phenomenon” (West & Turner, 2017, p. 47). Not only does theory help us to understand how and why events occur (Littlejohn & Foss, 2011), it can be conceptualized as both a process and a product (West & Turner, 2017). This dissertation constitutes both. First, this dissertation includes the process of theorizing about how mindset might be situated, related to, and even originated from various concepts within educational psychology and communication education. As a product, mindset theory has been studied and adjusted for over three decades. This dissertation represents new findings that add to this product and extend the reach of the theory as a whole. The theorizing present here generally follows a positivist (but sometimes interpretive) epistemological approach. The literature, approach, and findings of this dissertation stem from theory in three main areas: educational psychology, communication education, and instructional communication.

These three fields can all be traced back to many of the same early scholars, such as William James, John Dewey, and Edward Thorndike (Harris et al., 2012). With that said, as research has grown and scholars have worked to clearly define their fields and scope of research, differences in the three areas have emerged. Educational psychology is primarily concerned with increasing the “efficiency of learning” by understanding the role of learning and motivation in school (Harris et al., 2012). Instructional communication is similar in that it focuses on a broad educational context, but unique in

that it is concerned the role the human communication process has within that context (Fassett & Warren, 2010). Communication education is more subject-specific and is the study of teaching of speech communication. This research sits at the intersection of all three areas of scholarship. Despite their similarities, and some overlap, the terminology and theory used to describe cognitions surrounding performance and communication are distinct in both fields. While the argument can (and will) be made that a history of research in both fields supports the validity of communication mindset as a construct, it is important to note the clear ties which communication mindset has to both fields. Thus, the following literature review will begin with theories that are primarily present in educational psychology research, and then shift towards the instructional communication discipline.

Educational Psychology

Expectancy Value Theory

Atkinson (1957) wrote the seminal work on expectancy-value theory as a contrast to previous literature on motivational systems. Prior to his work, researchers had argued that a person's motivation was fundamentally driven by needs, whether those needs are for achievement, affiliation, power, or avoidance (McClelland, 1987) or the five layers of needs in Maslow's hierarchy (Maslow, 1958). Expectancy-value theory was one of the first to combine existing constructs of expectancy and values and make hypotheses about their motivational power. The theory argues that an individual's motivation to engage in any behavior is a combination of how probable the desired outcome is perceived to be, as well as the value of the desired outcome (Atkinson, 1957).

The first key piece of the theory is expectancies, originally defined as individuals' anticipation of either success or failure following performance (Atkinson, 1957). The definition of expectancies was later adjusted to distinguish between outcome expectancies and efficacy beliefs (Wigfield, 1994). Whereas outcome expectancies are a generalized belief that a given behavior can produce a specific outcome, efficacy beliefs are an individual's expectation that *they* can produce that specific outcome (Wigfield, 1994). The second key piece is values, defined as the attractiveness of the success or failure to complete that task (Atkinson, 1957). Tasks are valued for a number of different reasons, ranging from simple enjoyment to their relationship to achieving a long-desired goal (Wigfield & Eccles, 1992).

The first expectancy-value model was specifically designed to predict individual's motivation in achievement situations, such as the education system (Atkinson, 1957). A majority of educational research using expectancy value theory is concentrated in a few areas, including how children develop expectancies and values, and how those expectancies and values impact performance, task choice, and emotions (Wigfield & Cambria, 2010). In the first area concerned with the origin of expectancies and values, two primary influences have been identified. One influence is actual experiences in school environments. Evaluations and feedback, which are more present in educational environments than other areas, offer children distinct ideas as to in what areas they are most competent

A key finding of expectancy-value research which directly informed the development of mindset theory and which plays a key role in this dissertation is the

relationship between competency beliefs and expectancies for success (Wigfield & Eccles, 1992). Factor analysis determined that competency beliefs and expectancies for success were, in fact, the same construct (Wigfield & Eccles, 1992). Essentially, students were not distinguishing between their skill in a particular area and their future performance in that area. Although seemingly obvious now, this conclusion was a part of the original empirical support for students' perceptions of themselves to be a critical motivational force in academic situations (Hulleman et al., 2016). Furthermore, the idea that students used only their current skill in a particular area as a way to predict future results was the very first evidence of a fixed mindset, although it was not called that at the time. Following this new emphasis on the importance of expectancies, researchers began to attempt to understand from where student expectancies were coming.

Locus of Control

One explanation for students' expectancies was their locus of control. Locus of control describes an individual's perceived control over a specific outcome (Rotter, 1966). An external locus of control refers to an individual's perception that the outcome is controlled by outside factors over which an individual has no control, whereas an internal locus of control refers to the perception that an individual has the control or capacity to influence the outcome (Rotter, 1966). Behaviorism argues that a specific locus of control is developed over time for specific behaviors through the repetition of an outcome linked to that behavior (Skinner, 1966). However, Rotter (1992) clarified that a more generalized locus of control also exists, and in this sense, an individual's locus of control is actually more salient in novel situations.

Research investigating locus of control in academic situations quickly fell into a pattern. An internal locus of control was operationalized as students' beliefs related to their own ability or effort, whereas an external locus of control was operationalized as students' attribution of their own success as a result of the task itself or luck (Anazonwu, 1995). However, the results were mixed. Some studies found that students with an internal locus of control performed better in class (Anazonwu, 1995) and attended and engaged more (Tobin & Capie, 1982), but others found no relationship between locus of control and academic success (Ferrari & Parker, 1992). One literature review of over 200 studies did report the majority of studies found an association positive between an internal locus of control and academic success, but the magnitude of this association was small (Findley & Cooper, 1983).

One explanation for the weakness of the association between internal locus of control and academic success was the conflation of ability with effort. Bernard Weiner, a mentee of Atkinson, had elaborated on the role of expectancies in the academic environment and made the first distinction between ability and effort (Weiner, 2010). In his model, both ability and effort fall on the internal side of the locus of control, but they differ in their stability. Whereas ability is a stable part of internal control, effort is unstable, suggesting that individuals can choose to increase effort (Weiner, 1985). Therefore, the degree to which an outcome can be controlled by an individual's effort plays a key role in the individual's expectancy for that task (Weiner, 1985). This insight, positioned at the crossroads of expectancy-value theory and locus of control, would become the foundation for research on mindset theory.

One final idea deeply related to locus of control which would inspire mindset theory was learned helplessness. When an individual perceives an event as uncontrollable, particularly as a result of a failure to find a pattern between behavior and outcome, learned helplessness occurs (Maier & Seligman, 1976). Shortly after the original learned helplessness concept began to be studied, researchers started to distinguish between universal helplessness (in which a problem was fundamentally unsolvable by anyone) and personal helplessness (in which the individual sees the problem as fundamentally for them; Abramson et al., 1978). From there, the researchers began to link learned helplessness to both expectancies and self-esteem and perceptions of self (Abramson et al., 1978). Carol Dweck's original research began as an attempt to understand what kind of self-perceptions might cause learned helplessness.

Theories of Intelligence

Dweck was curious about the locus of control and learned helplessness, launching her first experiment in 1973. Dweck & Reppucci (1973) examined the interactions between expectancy of reinforcement (or the probability of receiving a reward) and the expectancy for control of reinforcement (the perception of oneself as a causal agent in behavior outcomes). A unique pattern emerged. While children were faced with failure they could not control, some children's performance deteriorated, while others did not (Dweck & Reppucci, 1973). The difference between these two types of children was reinforcement responsibility. Children whose performance deteriorated in the face of failure most often had an external reinforcement responsibility, blaming failure on outside factors they could not control (Dweck & Reppucci, 1973). Children whose

performance did not falter in the face of failure had an internal reinforcement responsibility and believed their own effort was responsible for the failure. Dweck & Reppucci (1973) named these patterns of behavior the helpless pattern and mastery-oriented helpless pattern.

Further investigation on these dichotomous patterns of behavior found attributions made in the face of failure varied. Mastery-oriented children attributed failure to lack of effort, whereas helpless children attributed failure to lack of ability (Dweck, 1975). Lack of effort attributions were found to be both predictive of success (Dweck, 1975) and strategy changes, including self-monitoring and increased perseverance (Diener & Dweck, 1978). Additional investigations of related beliefs found children with a mastery orientation thought failures could be overcome, whereas children with a helpless orientation viewed failures as insurmountable (Diener & Dweck, 1978, 1980).

Finally, in 1988, Dweck and Leggett sought out the deeper cognitions underlying mastery and helpless orientations. They tested children's theories of intelligence: some children had an incremental theory of intelligence (believing intelligence could be improved) and some had an entity theory of intelligence (believing intelligence was a fixed quality; Dweck & Leggett, 1988). Children holding both entity theory and incremental theory were found in students in the United States as well as students in Hong Kong, suggesting the distinction was generalizable across cultures (Chiu et al., 1997). Children with different theories of intelligence demonstrated differences on the cognitive, affective, and behavioral levels. Cognitively, the entity theorist children demonstrated negative self-cognitions and often verbalized their own deficits in

intelligence or memory (Dweck & Leggett, 1988). Incremental theorist children often verbally encouraged themselves and approached the task with more questions and the desire to seek more information (Dweck & Leggett, 1988). Affectively, entity theorists faced with failure experienced self-esteem drops and anxiety or depression, whereas incremental theorists seemed to enjoy failure (Dweck & Leggett, 1988). In one classic example, a child who was presented a series of puzzles that were extremely difficult “pulled up his chair, rubbed his hands together, smacked his lips, and cried out ‘I love a challenge!’” (Dweck, 2006, p.1). Perceiving failure as a challenge to do better was enjoyable, whereas perceiving failure as permanent led to resentment (Dweck & Leggett, 1988). Behaviorally, Dweck & Leggett (1988) argued that theories of intelligence influenced task choice, with entity theorists avoiding challenges and incremental theorists seeking out challenges.

These two theories of intelligence became the basis for what Dweck (2006) would later call “growth mindset” and “fixed mindset.” However, the differences in mindsets are now understood as more of a spectrum than a dichotomy. In fact, students’ mindsets parallel a normal distribution, with the majority of students having views that lie somewhere in the middle of a fixed and growth view (Ablard & Mills, 1996).

Achievement Goals

Before any review of the impact of mindset on academic success, it is important to cover one final theory base which is deeply intertwined with mindset theory: achievement goals. In the original Dweck & Leggett (1988) study, the children holding entity and incremental theories of intelligence had two different aims. The incremental

theorists were focused on mastering the task or skill at hand, whereas the entity theorists were only focused on performance of a skill (Elliott & Dweck, 1988). Dweck classified these two foci as learning goals (in which individuals seek to increase their competence) and performance goals (in which individuals seek to gain favorable judgements or avoid negative judgements from others; Dweck, 1986).

At the same time, many other theorists were also focusing on the goals that students focused on in achievement situations. Nicholls (1984) conceptualized the difference as ego-involved goals versus task-involved goals. A task-involved student made comparisons between his/her previous performance and current performance, whereas an ego-involved student made comparisons between his/her current performance and others' performances (Nicholls, 1984). Ames (1984) found distinctions between ability and mastery focused students. These perspectives were eventually synthesized and identified as mastery and performance goals, with mastery goals emphasizing the importance of developing a new skill and performance goals emphasize the importance of others' judgements of ability (Ames & Archer, 1988).

One additional study proposed an important difference within performance goals. Some performance goals were directed towards the demonstration of competence, whereas others were directed towards avoiding the demonstration of incompetence (Elliot & Harackiewicz, 1996)4/25/21 7:35:00 PMThis distinction was adopted into achievement goals theory, resulting in the final conceptualization of students' goals as either mastery-oriented, performance-approach, or performance-avoidance (Elliot & Church, 1997).

Impact of Mindset Theory

Now that the theoretical underpinnings of mindset theory have been thoroughly discussed, we can move on to reviewing the research on the impact of growth mindset in educational contexts. Five key areas are relevant: feedback, emotion, engagement, performance, and inequality.

First and foremost, mindset directly influences how students respond to feedback. When given negative feedback, students with a growth mindset more often attribute that feedback to their own effort, and as a result take more action to remedy the situation and improve (Hong et al., 1999). Students with a fixed mindset attribute that feedback to their skill or ability, and since they believe that skill is unchangeable, they tend to not only avoid feedback completely, but perceive it as failure and a reason to give up (Robin & Pals, 2002). Fixed mindset students also tended to explain away positive feedback or academic success, often attributing it to luck (Robins & Pals, 2002). In the face of actual academic failure, a growth mindset protects students' self-esteem and allows them to persist more easily (Niiya et al., 2004), whereas students with a fixed mindset report giving up (Robins & Pals, 2002). These cognitive differences translate into actual performance. Students with a growth mindset perform significantly better than fixed mindset students when "trying again" on a task they failed the first time (Li & Bates, 2019).

Students also report different emotional experiences with different mindsets. When presented with a difficult task, students with a growth mindset experience less anxiety than those with a fixed mindset (Burns & Isbell, 2007). In fact, one "hallmark" of

a growth mindset is being not only tolerant, but passionate about stretching one's abilities through challenge or difficulty (Frey et al., 2019). Students with growth mindset report an overall lower level of distress related to academics (Robins & Pals, 2002). A fixed mindset, however, is predictive of negative emotions such as anger, shame, hopelessness, and boredom (King et al., 2012; Luo et al., 2014).

Next, mindset predicts students' engagement in academic material. In one study, students with a fixed mindset (specifically towards math) reported valuing math less than growth mindset students (Karumbaiah et al., 2017). Another study of 7th and 9th graders experience in science classrooms found after a growth mindset intervention, the students reported increased interest for class content (Schmidt et al., 2017). A separate study found students' growth mindset towards math and science predicted career interest in those areas (Huang et al., 2019). Concrete engagement behaviors are predicted by mindset as well. Students with a growth mindset tend to have mastery goal orientations, which are predictive of more active cognitive engagement in course material (King et al., 2012). In contrast, a fixed mindset primes students to focus more on gaining social recognition or avoiding work (Meece et al., 1988). Students with mastery goals are more likely to report continuing to pursue the subject matter once the course is over (Lou & Noels, 2016). One study measured students' growth mindset towards, and found a positive relationship between growth mindset and students' self-reported behavioral, cognitive, and emotional engagement in class (Bostwick et al., 2020).

Mindset is sometimes predictive of students' actual performance in academic situations. Students with a growth mindset tend to score better than fixed mindset

students on academic tasks such as reading comprehension (Cho et al., 2019), math exams (Snyder, 1999), and standardized tests (McCutchen et al., 2016). In one study, holding a growth mindset was predictive of improving grades over two years of junior high school (Snyder, 1999). There are studies which have failed to find any association between mindset and academic performance (Bahník & Vranka, 2017; Macnamara & Rupani, 2017). However, two separate meta-analytical reviews examining the relationship between mindset and academic achievement both found a statistically significant association between the two (Costa & Faria, 2018; Sisk et al., 2018).

Finally, several notable mindset studies argue that a growth mindset can function as a buffer for some of the negative effects of systematic inequality. A pivotal study involving Carol Dweck in 2016 found that children from lower-income families were less likely to hold a growth mindset, but when they did hold a growth mindset, some of the negative effects of poverty on achievement were reduced (Claro et al., 2016). In addition, growth mindset interventions have been successfully used as a tool to increase motivation to learn and grades among rural adolescent girls, another marginalized demographic (Burnette et al., 2018). Growth mindset can also be helpful in reducing the achievement gap for underrepresented groups. For example, one study involving over 8,000 students successfully used a growth mindset intervention to reduce the GPA gap between white and Latinx students by 72% (Broda et al., 2018). One possible mechanism that has been uncovered for this success is that an increase in growth mindset reduces stereotype threat or the burden underrepresented students may carry of the prospect of confirming cultural stereotypes about their identity (Good et al., 2003). One intervention with female,

minority, and low-income participants used growth mindset to successfully increase the students' standardized math and reading test scores (Good et al., 2003).

Although the majority of studies (as described above) focus on mindset towards intelligence and the impacts on education, research has shown both mindset and learning goals are salient in many different domains. Athletes with a growth mindset react more positively after failures such as losing a game (Steyn & Potgieter, 2010), and a higher percentage of elite level athletes hold a growth mindset than a fixed mindset (Jowett & Spray, 2013). Having a growth mindset can also promote engagement in the workplace (Caniëls et al., 2018) and facilitates the development of the affective, cognitive, and behavior skills needed to retain employment (Sullivan & Page, 2020). Holding a mastery goal orientation is associated with job-seeking intensity in unemployed adults (Schroder et al., 2017). Mindset has also been discussed as a critical tool in learning musical skills (Deliège et al., 2011), creativity (Pretz & Nelson, 2017), and coping skills for anxiety (Schroder et al., 2017). Because of the wide application of mindset theory to such specific skills and situations, recent studies have sought to determine if domain-specific mindsets (i.e. “I can get smarter in math”) and more generalized mindset (i.e. “I can get smarter”) are empirically distinct. Consistently, this research shows that generalized mindset and domain-specific mindset are separate constructs (Pretz & Nelson, 2017; Schroder et al., 2016; Scott & Ghinea, 2014).

Communication Theory

As a theory primarily studied in educational psychology, much of the original mindset research was focused on growth mindset towards intelligence, or towards general education subjects such as math or science. However, in Dweck's original work, she argues that growth mindset could also be impactful in social domains (such as communication; Dweck & Leggett, 1988). Although very few researchers made an attempt to understand growth mindset in social domains, there is evidence of mindset-related constructions in the early research in communication theory. Specifically, the original constructs and studies published in both the communication education and instructional communication fields often reference perceived ability or competence task and performance-related anxiety. The following section will be modeled the same way as the previous one, beginning with earlier research in communication education and instructional communication, and moving into the most recent research that ties mindset and communication skills together.

Willingness to Communicate

In early communication research, cognitions regarding public speaking and communication abilities were conceptualized as Willingness to Communication (WTC). WTC was originally developed by Burgoon (1976) and conceptualized as unwillingness to communicate, or "a chronic tendency to avoid and or de-value oral communication" (Burgoon, 1976, p.60). The construct was re-defined by McCroskey and Baer (1985) as "the probability that an individual would choose to initiate communication given the opportunity" and a scale to measure WTC was tested (p. 17). WTC is predictive of both

frequency of communication and positive ratings of communication outcomes (McCroskey & Richmond, 1990). It was later proposed that WTC acts as both a trait and state variable, with trait WTC acting as a predictor of volunteering for a communication study and state WTC predicting the initiation of a difficult conversation within that study (MacIntyre et al., 1999).

Structural equation modeling was used to measure predictors of WTC. These primarily include communication apprehension and perceived communication competence (MacIntyre, 1994; McCroskey & Baer, 1985). However, the original structural equation model using communication apprehension and interpersonal communication competence still only accounted for 60% of the variance in WTC (McCroskey & Baer, 1985). Since then, more studies have detected the influence of different variables, many of which are similar or related to mindset theory. Self-confidence (Cao & Philp, 2006), goal-setting (Munezane, 2015), and students perceptions of themselves as learners (Léger & Storch, 2009) all directly predicted WTC.

Communication Competence

Communication competence was originally defined as “adequate ability to pass along or give information; the ability to make known by talking or writing” (McCroskey & McCroskey, 1988, p. 2). Since then, communication competence has been understood in a multitude of ways over the years, beginning with the idea of competence as a subjective evaluation of the quality with which someone performs (Spitzberg & Cupach, 1984). Unlike cognitive variables such as communication anxiety or willingness to communicate, competence has two unique sides: one which refers to the actual skill level,

and one which refers to the skill level perceived by others (Spitzberg & Cupbach, 1984). Interpersonal communication competence (ICC), then, indicates that an individual is making communication choices that are both appropriate (within the context) and effective (or successful in achieving the aim) in an interpersonal communication setting (Spitzberg & Cupbach, 1984). The level of ICC held by an individual can impact everything from conflict management (Spitzberg et al., 2013) to teacher-student interactions (Spitzberg & Hurt, 1987) to loneliness (Spitzberg & Canary, 1985).

Many different models attempt to explain the dimensions of interpersonal communication competence. Spitzberg & Hecht (1984) originally proposed three dimensions: motivation, knowledge, and skills. These three factors were able to predict satisfaction with the self, the other, and the communication itself (Spitzberg & Hecht, 1984). Rubin & Martin (1994) defined ICC as “an impression or judgement formed about a person’s ability to manage interpersonal relationships in communication settings” and expanded the model from three to ten dimensions: self-disclosure, empathy, social relaxation, assertiveness, interaction management, altercentrism, expressiveness, supportiveness, immediacy, and environmental control (Rubin & Martin, 1994).

Finally, McCroskey & McCroskey (1988) noted that while Rubin & Martin (1994) provided a subjective assessment scale, an additional construct worthy of measurement was self-perceived communication competence (SPCC). SPCC is measured through specific questions of competence in four contexts (dyad, small group, large meeting, public speaking) and for three different audiences (strangers, acquaintances, friends). Although applicable in many contexts, SPCC is particularly relevant in

classroom and learning settings. Academically at-risk students report lower SPCC (Chesebro et al., 1992) and academically talented students report higher SPCC (Rosenfeld et al., 1995). SPCC is highly correlated with self-esteem, introversion, and sociability in school (Richmond et al., 1989), and the introductory course can improve SPCC (Broeckelman-Post & Pyle, 2017; Rubin et al., 1997; Suwinvattichaiorn & Broeckelman-Post, 2016; Westwick et al., 2016).

Communication Apprehension

Communication Apprehension (CA), or “an individual’s level of fear or anxiety associated with either real or anticipated communication” (McCroskey & Richmond, 2006, p.55) was developed in the 1970s, when an Ad Hoc Committee for the Speech Association of America was tasked with expanding evaluation and measurement of the field. The committee noted that many problems in speech communication pedagogy “may result from students’ inhibitions rather than their ability,” thus spurring a line of research into the cognitions underlying poor communication (McCroskey, 1970, p. 269). As mindset is a potentially underlying reason for these negative inhibitions, communication mindset research can be viewed as an extension of the committee’s request.

The construct of communication apprehension has origins in research on reticent speakers. Phillips (1968) defined reticence as the “pathology of the normal speaker” and viewed high reticence individuals as people “for whom anxiety about participation in oral communication outweighs his or her projection of gain from the situation” (Phillips, 1968, p.40). The definition of reticence is important to note because it has stark parallels

with expectancy-value theory, the central underlying assumption for mindset theory.

McCroskey (1977) argues that reticence and communication apprehension are essentially the same thing: a global predisposition to avoid communication that has a multiplicity of causes, correlates, and consequences.

CA occurs on multiple levels. Anxiety itself is often separated into trait anxiety (a stable, mostly permanent individual difference) and state anxiety (a transitory condition which fluctuates over time; Spielberger, 1966). Similarly, CA can be viewed as a traitlike variable which is applicable and salient across a variety of contexts (McCroskey & McCroskey, 1988). Trait CA is studied as a neurologically based construct which has biological causes (Beatty et al., 1998) and twin studies show that it may have a genetic component (Beatty et al., 2002). Thus, the causes of CA are often deeply interrelated with other physiological constructs, such as neurological arousability (Finn, Sawyer, & Behnke, 2009) and sociability (McCroskey, 2009). Context CA also exists and is a version of trait CA that endures over time but is specific to a given context (McCroskey, 1984). Even more narrow is the person-group (CA specific to a person or group) and situational view (CA specific to one situation; McCroskey, 1984).

The relationship between trait, state, and context CA is complicated. Trait CA is a strong predictor of state CA (Booth-Butterfield & Butterfield, 1986), and context CA predicts a minimum of 50% of the variance in state CA (Booth-Butterfield & Gould, 1986). However, research also shows that state CA is predictive of subsequent trait CA scores (Beatty et al., 1991). One study showed that trait and state CA were significantly

correlated early on in a dyadic relationship, but that later in the relationship that correlation disappeared (McCroskey, 1984).

Not all causes of CA are physiological. McCroskey (2009) argues that an understanding of the causes of CA is not complete without looking at learning expectancies as well as learned helplessness. In fact, the “foundation of communication anxiety,” McCroskey (2009) argues, is the expectation held by an individual regarding the likely outcome of the communication. When an individual is consistently expecting a negative result, and especially when that expectation is consistently found to be accurate, anxiety is produced (McCroskey, 2009). This argument is not only strikingly similar to the foundation of expectancy-value theory, but many studies have examined the relationship between communication apprehension and the foundational constructs behind mindset theory. Student expectations of success or failure are a significant predictor of communication apprehension (Greene & Sparks, 1983). Research by McCroskey and his colleagues found a correlation between communication apprehension and an external locus of control (McCroskey et al., 1976), a finding which was replicated later by experts in locus of control (Rubin, 1993). One study focusing on goal orientations found students with a mastery goal were more invested in social interactions, although anxiety was not measured specifically (Poortvliet & Darnon, 2010).

Public Speaking Anxiety

The most commonly studied version of generalized-context CA is Public Speaking Anxiety (PSA). Early research on public speaking anxiety was focused on stage

fright. At the basis of the construct “stage fright” is the idea that public speaking gives rise to a specific emotional reaction, which then influences actual performance (Ayres, 1986). The degree of stage fright is primarily based on the discrepancies between an individuals’ perceived ability and what that individual perceived the audience to expect from them (Ayres, 1986). Thus, stage fright research is distinctly similar to expectancy-value theory, in that student expectations of their own performance influence the value they are placing on that performance.

Over time, concepts similar to public speaking anxiety have been studied under the name speech fear, speech anxiety, audience anxiety, and performance anxiety (Bodie, 2010). Public speaking anxiety (PSA) is uniquely defined as “a specific subtype of communication-based anxiety whereby individuals experience physiological arousal, negative self-focused cognitions, and/or behavior concomitants in response to an expected or actual presentation” (Daly, 1978).

Public speaking anxiety is influenced by a multitude of factors. First and foremost, state PSA is predicted by trait CA (Beatty, 1988a) as well as trait PSA (Beatty & Friedland, 1990). Global traits such as extroversion, emotional stability, and intellect are negatively correlated with public speaking anxiety (MacIntyre & Thivierge, 1995). Anxiety is typically higher if the situation is perceived as more novel or if there is a high amount of social comparison (Beatty, 1988a), and anxiety is lower if the audience is perceived as pleasant (MacIntyre & MacDonald, 1998). Other contextual factors, such as the importance of making a positive impression, the possession of skills needed to communicate effectively, and estimation of the type of impression made are more

predictive of state PSA than disposition, or trait PSA (Keaten & Kelly, 2004). Individuals with high PSA also approach the speaking environment fundamentally differently. High PSA individuals pay more attention to themselves and less attention to their environment, report more self-focused cognitions about performance, and rate their own performance as lower than low PSA individuals (Daly, Vangelisti, & Lawrence, 1989).

This is where the connection to mindset begins to arise once again, as the original Dweck & Leggett (1988) study observed fixed mindset students making negative remarks about their own ability in the same manner high PSA individuals did in the Daly et al. (1989) experiment. High PSA individuals also are more interested and anxious about how evaluation will occur than low PSA individuals (Daly, Vangelisti, Neel, et al., 1989), in much the same way that students with performance goals fixate on evaluation (Ames & Archer, 1988). Additionally, high PSA is correlated with a high demand for approval from others, a key characteristic of the performance-based goal-orientation that accompanies a fixed mindset (Lohr & Rea, 1981).

Like intervention-focused mindset research, a large body of studies focus on reducing CA and PSA. Many treatments for CA are related to the biological causes of CA. Systematic desensitization, which is typically used to treat neurological disorders such as anxiety, has been shown to reduce CA (Ayres & Hopf, 1987) and is one of the most common treatments (Kelly & Keaten, 2000). Systematic desensitization can fall under the communibiological paradigm because it sometimes pairs the presentation of stimuli with deep muscle relaxation techniques, targeting the physiological as well as cognitive foundation of CA (Kelly & Keaten, 2000).

A related technique, exposure therapy, involves repeated exposure to the same environment, and the familiarity of that environment reduces the anxiety surrounding the environment. Some scholars have proposed that one reason the introductory course successfully reduces PSA is because it provides repeated exposure to public speaking in the controlled, supportive environment of the classroom (Duff et al., 2007; J. D. Finn & Zimmer, 2012). One study found no difference between students enrolled in visualization-based and exposure-based therapies over students in the control group who were enrolled in the introductory public speaking course (Duff et al., 2007). Another contradicting study that specifically created a multiple exposure speaking assignment in line with exposure therapy within the introductory course found students in the treatment condition reduced their public speaking anxiety significantly more than the control condition (A. N. Finn et al., 2009) (J. D. Finn & Zimmer, 2012).

More recently, virtual reality has been investigated as a promising therapy for public speaking anxiety. Researchers have used 360-degree virtual reality (VR) to create realistic anxiety experiences in a controlled setting, and exposure to those anxiety experiences successfully reduces public speaking anxiety (Stupar-Rutenfrans et al., 2017). Qualitative research has confirmed that students perceive these virtual training sessions as useful (Vallade & Kaufmann, 2018). However, one study which measured outcome expectancy (or the extent that students anticipated improving their communication skills in therapy) found that across both virtual reality and cognitive-behavioral approaches, outcome expectancy significantly predicted how much participants actually changed during therapy (Price & Anderson, 2012)

Communication Mindset

Communication Mindset is the degree to which an individual believes they can change or improve their communication skills (Nordin & Broeckelman-Post, 2019; 2020). Although the Nordin & Broeckelman-Post (2019) study was one the first to use the term “communication mindset” and study the phenomenon, related studies had examined the roll of mindset as related to communication or social skills. For example, a growth mindset towards introversion reduces anxiety surrounding social situations (Beer, 2002) and reduces overall social anxiety (Valentiner et al., 2013). Additionally, a fixed mindset towards public speaking specifically is negatively correlated with public speaking anxiety (Stewart et al., 2019).

Communication mindset is distinct from other, well-established variables in the field of instructional communication, such as SPCC, CA, and PSA. While SPCC measures an individual’s perception of their communication competence at the current time (McCroskey & McCroskey, 1988), communication mindset is focused on their perception of whether or not that competence could or will eventually improve (Nordin & Broeckelman-Post, 2019). Similarly, a student could feel extremely anxious about communicating (high CA) or about public speaking (PSA) and yet believe that their communication skills can and will improve. The close, yet complex relationship between these constructs will be discussed later in the manuscript.

The two previous studies on communication mindset specifically offer a few pieces of insight as to how the construct may be functioning in relationship to other

variables. The first study found growth mindset was negatively correlated with public speaking anxiety, and positively correlated with actual speech grades as well as interpersonal communication competence (ICC) and student engagement (Nordin & Broeckelman-Post, 2019). Additionally, and perhaps most interestingly, the first study found that growth mindset and ICC predict student engagement in the introductory course, but public speaking anxiety does not (Nordin & Broeckelman-Post, 2019). The second study found that although the introductory course reduces PSA and ICC, and increases communication self-efficacy, the course does not meaningfully change students' communication mindset (Nordin & Broeckelman-Post, 2020). Additionally, communication mindset levels were different across demographic groups. Women had more of a growth communication mindset, but higher public speaking anxiety than men (Nordin & Broeckelman-Post, 2020). Asian students and Middle Eastern students had a significantly more fixed mindset than other demographic groups, and students whose first language was not English had a more fixed mindset than their English as a first language peers (Nordin & Broeckelman-Post, 2020).

CH. 3: DEVELOPMENT & PILOT TEST

Introduction

In 2016, the *Journal of Educational Psychology* published a special issue focusing on psychologically informed instructional activities that successfully changed students' attitudes and beliefs. Many of the instructional activities focused on motivation – and for good reason. Even when accounting for factors like cognitive ability, home environment, and teacher quality, there is still a wide variety in students' performance (Lin-Siegler et al., 2016). In recent years, the evidence has mounted which points to academic motivation as the missing source which can help predict, explain, and ultimately improve student performance (Lin-Siegler et al., 2016). However, there has been somewhat of a struggle translating the promising theoretical findings into practice. Kaplan et al. (2011) argue the existence of a “mismatch” between prevalent research methods and the nature of educational settings, pointing to the clear differences between a controlled laboratory setting and the complex context of a classroom or school, as well as the reliance on self-report measures as key challenges for researchers. To remedy this mismatch, Kaplan et al. (2011) argue scholars need to adopt a design-based approach to research.

A design-based approach focuses on the development of interventions that are based in the perceptions and opinions of the individuals who will actually be using the product (Lyon & Koerner, 2016). This focus is undoubtedly needed, as researchers have argued that the input side of interventions (the development process) has received considerably less attention than the output (the effectiveness testing process; DeJong et

al., 2004). In school psychology specifically, a majority of evidence-based interventions are developed from existing knowledge and theory, without formative research and attention paid to the specific target population (Nastasi & Schensul, 2005). When these promising interventions are then moved from the laboratory to the classroom, they fail to reproduce the positive results (Kaplan et al., 2011).

One of the areas of research where design-thinking has been applied to improve intervention design is mindset theory (Yeager et al., 2016). Mindset theory poses a distinction between students who believe personality traits (such as intelligence) can be grown and improved (growth mindset) and students who believe they are fixed, unchangeable qualities (fixed mindset; Dweck, 1975, 2006; Dweck & Leggett, 1988). Research on interventions that promote a growth mindset in students show tentative success (Aronson et al., 2002; Blackwell et al., 2007; Paunesku et al., 2015), but are most often developed without formative evaluation. Yeager et al.'s (2016) research, however, utilized one-on-one interviews with students to discuss messaging and key concepts to update and improve a traditional mindset intervention. The updated intervention yielded better scores than the traditional, both in short term mindset improvement and long-term GPAs of high school students (Yeager et al., 2016).

Previous studies in the field of instructional communication have demonstrated that communication mindset, or a students' mindset towards communication skills specifically, predicts students' engagement and grades within the introductory course (Nordin & Broeckelman-Post, 2019). However, students' communication mindset did not improve after one semester of the introductory course, and gaps exists in student growth

mindset between students of different gender, race/ethnicity, and language status (Nordin & Broeckelman-Post, 2020). The need for a communication mindset intervention is clear. In response to this need, the goal of the current study is to develop a communication mindset intervention. Guided by the principles of implementation science and user-centered design, the first stage of the current study involves in-depth formative interviews with current introductory course students. The second stage of the current study will describe the development process as well as the results of the first pilot test.

Literature Review

Mental Models

When interacting with the external environment, people form mental models which predict and explain the interaction (Gentner & Stevens, 2014; Johnson-Laird, 1983). These models can be more clearly defined as analogical representations of reality and allow us to create mental representations of potential future events (Johnson-Laird, 1983). For example, an individual is able to imagine what might happen if the chain on a bicycle breaks, without individually thinking about each part and the relationships between them (Greca & Moreira, 2000). Mental models are a useful tool because they can help researchers carefully examine the way people understand a specific domain of knowledge (Greca & Moreira, 2000).

A mental model approach is common in the field of scientific education, where researchers use the framework to better understand why students hold misconceptions about scientific phenomena (Greca & Moreira, 2000). Similarly, risk communication

scholars often used mental models to understand the difference between a lay person's comprehension of a risk (such as climate change) and an expert's conceptualization (Atman et al., 1994; Morgan et al., 2002). Even beyond simple understanding, mental models have been used as a basis for risk communication interventions (Breakwell, 2001). To do this, researchers conduct mental model interviews, which are open-ended interviews that elicit individuals' beliefs about a hazard, expressed in their own terms (Morgan et al., 2002). Within the interviews, researchers use metaphors to represent the way experts mentally model the hazard, asking participants for their feedback and response to those metaphors (Morgan et al., 2002). This data can be used to inform interventions which provide information and motivation for people holding the original misconception in hopes of changing their mental model of the hazard to match the expert model (Breakwell, 2001).

Communication Apprehension

There is evidence to suggest that individuals hold mental models regarding communication, and that these models differ significantly across individuals. Individuals fear public speaking more often than they fear death (Dwyer & Davidson, 2012), pointing to the idea that it could be conceptualized as a "hazard" for many individuals. Concurrent with the original predictive definition of mental models, studies also show individuals hold expectations about how communication events will turn out, and these expectations can cause anxiety (Greene & Sparks, 1983). However, these expectations vary greatly. One study examined the expectation or prediction causing students the most anxiety, finding 12 different categories of fear across 828 students (LeFebvre et al., 2018). Of the

fears that were reported, 25% were internal fears (such as self-regulation issues such as memory glitches or eye contact) and 75% were external fears (such as audience judgement or perceived incomprehension (LeFebvre et al., 2018). Further, students with high public speaking anxiety report thinking more negative thoughts about themselves and worry more about the judgement of others (Daly, Vangelisti, & Lawrence, 1989). Although research in communication has yet to directly involve mental models, these studies point to the conclusion that differing mental models could provide insight into communication apprehension and public speaking anxiety.

There is also evidence to suggest that when mental models regarding communication change, anxiety is reduced. Researchers have used “imagined interactions,” defined as imaginary anticipated future communication interactions with others and found changing the imagined interaction successfully reduced communication apprehension (Honeycutt et al., 2009, p. 6). One early intervention (Ayres & Hopf, 1985) had participants use visualization techniques to envision a public speaking performance, which decreased stage fright and anxiety. Other cognitive approaches to reducing CA and PSA have also been successful. Cognitive restructuring (Fremouw & Scott, 1979) targets negative thoughts and cognitions related to public speaking. Two components (extinction and insight) help the individual to understand negative self-statements which occur during communication, one component (rehearsal) involves developing positive coping statements, and the last element combines the insight on negative statements with the rehearsal of coping statements. Each of these popular therapies of systematic

desensitization, visualization, and cognitive restructuring all address different mental components of communication anxiety (Dwyer, 2000).

Mindset Theory

If a student's mindset is a prediction about whether personality traits can be improved (Dweck & Leggett, 1988), and a mental model is an explanation about how something works in the world (Johnson-Laird, 1983), then mindset is a very specific type of mental model. While the mental model underlying growth mindset explains skills improve by a combination of effort and practice, the mental model underlying fixed mindset asserts that skills are not created through effort but instead are just something that one either does or does not have. To understand how it may be possible to change mindset, a review of previous intervention literature is warranted.

There is plenty of evidence to suggest it is possible to change mindset. In some of the original work, mastery and helpless orientations in children were manipulated by the experimenters through a training procedure as an independent variable (Dweck, 1975). However, it was not until Aronson, Fried, & Good's (2002) seminal work on mindset and stereotype threat that a mindset intervention was tested beyond a laboratory setting. Aronson et al. (2002) recruited college students under the guise of a pen pal program and asked them to write letters to a younger peer. Half of the college students were shown a brief video clip describing how intelligence is capable of growing like a muscle, and this incremental theorist view was reinforced through the writing of the letters. It is important to note here that the "growing like a muscle" prompt is exactly what is typically used in mental model research (Morgan et al., 2002): a metaphor used to explain an expert's

conceptualization of a phenomenon. The intervention caused students to enjoy and value academics more as well as improved grades (Aronson et al., 2002). Blackwell, Trzesniewski, & Dweck (2007) replicated the “intelligence is like a muscle” message for adolescents, and the intervention predicted more success during the academic transition into high school. The same “intelligence is like a muscle” message was found to be an effective intervention for at-risk students and improved their core course grades as well as GPA (Paunesku et al., 2015).

Because communication apprehension and mindset theory both have similarities with mental models, and because user-focused design is centered around the perceptions of individuals who will actually be using an intervention, this study will use mental models interviews to understand how students in the introductory course conceptualize the process of improving communication skills. Two research questions are proposed:

RQ 1: How do students conceptualize the process of improving communication skills?

RQ 2: What mental models do students use when imagining the process of growing communication skills?

Phase 1: Formative Interviews

Method

Undergraduate students at a large northeastern public university were recruited through the online introductory communication course. During the course, students are

offered credit for participating in research projects. In order to avoid extensive influence from the course curriculum, all interviews were conducted within the first two weeks of the course. All interviews were video recorded. The interview protocol contained questions asking about students' broad conceptualization of communication skills, what made someone a good or bad communicator, and asked the student to respond to several potential metaphors that could be used in the intervention. The interviews were open-ended, which allowed the interviewer to probe unexpected answers and elaborate on key concepts. The metaphors of "genetics" and "talent" were used to explore evidence of a fixed communication mindset, and the metaphors of "riding a bike" and "building muscles" will be used to explore evidence of growth mindset. The full interview protocol is available in appendix A.

Eleven students participated in the study. Eight were female and three were male. None reported having previous extensive public speaking or communication experience (such as participating on a speech and debate team). All participants were entering their sophomore or junior year of college in the fall of 2019. The average age of the participants was 19, and all participants were between the ages of 18 and 22. The interviews ranged from 17 to 47 minutes long, with the average interview lasting 31 minutes. The participant's names have been replaced with pseudonyms in the sections below in order to protect confidentiality.

Thematic analysis was used to analyze the data. Thematic analysis is "a method for systematically identifying, organizing, and offering insight into patterns of meaning (themes) across a data set" (Braun & Clark, 2012, p. 57). Because thematic analysis is

ideal for detecting collective or shared meaning (Braun & Clark, 2012), this method was considered ideal for uncovering students' understanding of communication skills and how to improve them.

Lindlof (1995) suggests three phases of thematic analysis: The first stage is data management (Lindlof, 1995). In data management, the researcher uses tools to categorize data in order to get a first semblance of what information may be there. In this study, the data management process included organizing the responses together by question. The data were then read in full and then categorized based on the interpretation that began to emerge. The second step, data reduction, involves reduces the size of the data by pinpointing what areas are of the most priority. For the present study, the data was reduced by using color coding to identify statements that supported the emerging themes. The final stage is conceptual development. In conceptual development, the concepts, themes, and meanings of the study begin to emerge. This involved re-reading the high priority statements and using the researchers' background and knowledge of theory to contextualize the findings. Finally, the researcher re-read the entire content of the interview transcripts one week after the conceptual development stage, in order to re-visit the data.

Results

In response to research question one regarding students' conceptualization of communication skills, themes emerged from the data regarding the following: the achievement of mutual understanding, the importance of delivery skills, communication

as a unique skill, the role of motivation, and the role of previous experiences. Following a discussion of these themes, reactions to each of the metaphors that were tested in response to research question two will be discussed.

The achievement of mutual understanding. When students were asked to define communication skills, many mentioned the notion of establishing mutual or shared understanding between individuals. Kelsey provided a clear and succinct definition, explaining that communication is “the ability to understand another person and the ability to be understood by them.” Being a good communicator indicated an individual would take on the burden of ensuring that mutual understanding occurred, or as Jason put it, “It's up to you to be able to articulate those into words and then have other people understand it.” When asked to cite examples of people with good communication skills, the notion of creating mutual understanding was often linked to the ability to see the perspectives of others. Diana’s example of a good communicator was “really good at putting himself in other people's shoes,” and she emphasized the emotional understand and empathy that framed the communication process. Similarly, Jackie’s example would notice when someone was feeling upset “and say like, what's wrong, or something like that -- she'll just be really active and engaging and she like checks in on me too,” hinting at both interpersonal communication competence and a willingness to communicate in tough situations. John nodded to intercultural communication skills in his example, explaining the person had “a good understanding of different people's backgrounds and cultures.” This same notion of empathy and mutual understanding was present in examples provided of individuals who communicated poorly. Rose felt a co-worker was a poor

communicator because “It's not a priority for him to see things from [the customer's] point of view,” and Jackie felt a classmate was a poor communicator because when encountering a conflicting opinion, he would “tend to usually just dismiss the statement and not keep an open mind.”

The role of physical and vocal delivery skills. Some of the first characteristics mentioned when asked about good communication and poor communication were those of physical and vocal delivery. For example, one Jackie explained the following when asked what good communication looks like:

I know it's important to have eye contact with people. I know that you're supposed to usually, if it's like a speech or something to be prepared and not look down too much and maintain ... Not like read off of something. And for just like talking one on one is just also good to have the eye contact and just make sure that you're listening well and respond to the people. Don't just be silent the whole time.

Several other participants mentioned eye contact or facial expressions, such as Kelsey who said her friend that was a good communicator “looks at you when she's talking to you, makes eye contact, and treats you like you are the most important thing she's doing right then.” Another participant, John, described a poor communicator he knew by saying “It's really hard for me to hear him. I can only pick up bits and pieces of his sentence, because he talks really softly.”

Communication as a unique skill. Participants were asked to compare communication skills with other skills such as math or reading. All eleven participants identified communication as different than both of those skills. One common difference

was the subjectivity of communication. Karen explained “It seems that you can more objectively test reading or math skills than you can communication skills, because there's so many other factors that can't be measured or quantified for successful communication.” This focus on evaluation was shared by Rose, who explained “For an equation or something, there might be a bunch of different ways to arrive at the same answer, but once you get that answer, either it's right or it's wrong... with communication, there's really no way of knowing whether or not you did it right.”

Some participants also noted a distinction between communication skills and public speaking skills. Public speaking was seen as more of an individual phenomenon; as Diana explains, “Talking to someone like a one-on-one conversation is definitely different from public speaking, because you're going back and forth, when it's between two people. When it's public speaking, normally it's just all you talking to a group of people.” Public speaking was also a more isolated skill, and as John articulated, “You're also talking to a bunch of people that you don't necessarily know... that sense of the unknown could scare a lot of people.”

The role of motivation. Although participants were not directly asked about motivation, most of them spontaneously mentioned motivation as playing a key role in whether or not communication skills could be improved. Sometimes this motivation came from an external source, and some internal. Karen argued that communication could be improved, “If there's some other reward. There's either something you want to achieve or you really want to be able to share.” John agreed, explaining, “I think it takes a person to actually want to improve. Then if that person actually puts in the effort to improve their

communication skills, then they'll see improvement.” Motivation played a key role because it determined the amount of effort someone would put into the process of improving. Jackie explained, “If you're not really motivated then you're probably not going to put in as much effort as you would like.”

The role of previous experience. Participants were also not asked to provide any examples of previous communication experiences. However, most of the students who identified communication as a skill which could be improved cited their own journey or growth as evidence that improvement could occur. Peyton explained, “I was really shy when I was younger and I was really nervous about public speaking... when I was younger I just wouldn't like talking to as many people. So now that I've been in college, I've been more outgoing and just opened up more.” However, the descriptions of improvement did not include specific efforts, and instead just described change spontaneously occurring over time. Alex described, “I didn't really talk that much, and when I did talk I was really quiet. But I want to say nowadays, I'm definitely a lot better,” but when probed on what made him become a lot better said, “I guess I'm not really sure.”

Fixed mindset metaphor responses. Every participant was asked to respond to the statement “Communication skills are genetic.” Most participants agreed with this statement in part, but not fully. Diana, for example, supported the idea that, “Everyone starts with kind of a base of communication,” and Kelsey agreed, “Definitely there's a genetic component to it.” However, the students noted that thinking about communication using this metaphor felt restrictive (in a way very similar to having a

fixed mindset). John explained, if he was told communication was genetic, he “wouldn't have much faith in improving my communication skills.” Sam added that in a world where communication was genetic, “You would have a tough time fixing it if you were bad it.”

Growth mindset metaphor responses. The participants were more receptive to the metaphors of riding a bike and building muscles. Karen felt building muscle was “a much better analogy.” Whereas the metaphor of riding a bike was most often related to the idea that “You wouldn't really have to work to maintain [communication skills],” the idea of building muscle seemed to prompt participants to think of specific behaviors that one could use to improve communication skills. Kelsey related the muscle building metaphor to the idea that communication requires time to improve. She explained, “So often we think that cognitive skills are something that we should be able to show immediate improvement that's really great,” but the muscle building metaphor reminds individuals that, “You wouldn't expect to go workout one Sunday afternoon, and if you just do it long enough and hard enough you're going to go home with big muscles.” John recognized the metaphor for implying small but important improvements, saying, “Every time you reconstruct [your communication skill] it becomes a little bit more sophisticated and more toned.” Many participants also noted the muscle building metaphor emphasized the importance of practice and repetition, such as Sam who said that “99% of things, you just get better the same way, which is you just do it and you see what you did wrong, and then you fix that. Then you see what you did wrong and you fix that. You just do that a million times until you're really good at it.”

Discussion

The purpose of the first phase of this study was to inform the development of a communication mindset intervention using mental models based formative interviews. Three key findings are discussed below.

First, this research supports the notion that students see communication as a distinct and unique skill. Students consistently distinguished communication skills from other academic skills such as math or reading. They emphasized the ambiguity of improving communication skills due to differing perceptions and preferences on communication. Most participants separated the process of improving communication skills, and the ability to be “good at” communication, from reading or math, pointing to both the existence and relevance of a domain-specific “communication mindset.” Although previous quantitative studies have empirically shown the separation between a more generalized mindset regarding intelligence overall and specific types of skills (i.e. math skills; Scott & Ghinea, 2014), to the researcher’s knowledge, this is the first qualitative support for such a distinction. Part of the distinction that was specific to communication was the notion of objectivity. While math and reading had a clear and distinct “correct answer,” communication skills lacked this objectiveness, which made them more complicated.

In addition, students consistently mentioned the role of previous experiences when discussing the ability to improve communication skills. The students who indicated that they did believe communication skills could be improved (growth mindset)

frequently supported this argument with a story or anecdote of a time when they improved their own skill. This finding is consistent with previous interventions for mindset, which ask students to write a letter to a future student that describes a time when they improved their skills (Yeager, 2012). However, the students did not mention any specific effort or challenges they made in order to improve their communication skills, and when prompted, one student did not know. This may point to the need to emphasize specific actions students could take to improve their communication skills as part of the evidence supporting a growth mindset.

Finally, the third major finding that informed the development of the communication mindset intervention was the students' reactions to the growing muscle metaphor. Students who endorsed the metaphor and displayed a growth mindset frequently mentioned the specific actions or behaviors that are required to improve communication skills. Beyond simply focusing on the idea that communication skills could be improved, the students who had a growth mindset displayed an understanding of what types of practice techniques and work ethic were required to make such improvement occur.

Intervention Development

Three main components are the basis of the majority of mindset interventions. First, students are asked to read a research paper containing scientific evidence that it is possible to grow intelligence (Aronson et al., 2002). Second, students are asked to generate a personal example of a time when they believe they got smarter. Third,

participate author a letter to a hypothetical future student that might be struggling in school (Aronson et al., 2002). This approach to mindset interventions uses theory to build the intervention design and is the most common in the literature to date.

Although not at all conceptualized by the researchers as a mindset intervention, an early intervention for communication apprehension functioned in much the same way. Ayres & Hopf (1985) used a visualization script emphasizing *mastery* of the public speaking skill, which could have activated mastery goals and growth mindset among the participants (Ayres & Hopf, 1985). Similarly, a videotape used to successfully increase positive self-cognitions during a speech and reduce public speaking anxiety introduced students to the process and research behind the success of systemic desensitization for reduce anxiety surrounding speech skills. Essentially, in this study, the researchers presented students with *clear scientific evidence that communication skills could be improved* (Ayres et al., 1993), an almost identical approach to successful mindset interventions which present students with clear scientific evidence of intelligence being improved (Aronson et al., 2002; Yeager, 2012). Again, no specific theory was used to design the video intervention, but the researchers may have unknowingly produced growth mindset in their participants.

The development of the communication mindset intervention used this previous body of literature as a foundation but adapted according to the findings of the previous qualitative interviews. Since a variety of formats have been used before, and research has not yet determined what would be the most effective, multiple formats of a communication mindset intervention were developed. These formats included a text

format, an activity format, and a video format. All three formats included the core message that growing communication skills was like building muscle.

First, a simple text-based intervention was created. The original text from the Yeager et al. (2016) study was used as a base, but it was updated to reflect the domain-specific qualities students mentioned. The phrase, “Many people think of communication skills as a mystery,” was added to the beginning to get at the ambiguity participants mentioned. Domain-specific examples of struggle which multiple participants mentioned (nerves, gestures, interview questions) were also added. For a full version of the intervention message, see Appendix A.

Second, an independent “activity” version of a communication mindset intervention was developed. In the activity intervention, students are asked to write a letter to a future public speaking student, telling the story of a time where they were able to improve their communication skills “just like a muscle.” The messaging therefore stays consistent with the text intervention, but rather than reading empirical support, students themselves are asked to provide the support.

Third, a video intervention was created. Since communication was viewed as a dynamic, and subjective skill, the purpose of the video intervention was to actually show the process of improvement. The video intervention design was informed by several experiments related to self-efficacy which also used improvement videos. Schunk & Hanson (1985) exposed children to peer models of specific skills. There were two types of models: a peer mastery model and a peer coping model (Schunk & Hanson, 1985). The peer mastery model clearly demonstrated skill and used verbal utterances related to

success (Schunk & Hanson, 1985). The peer coping model started by demonstrating failure at the designated task, but used verbal utterances related to improvement and eventually succeeded (Schunk & Hanson, 1985). Children who watched the peer coping model had increased self-efficacy for the task and had higher achievement beliefs, which are almost identical to growth mindset (Schunk & Hanson, 1985). Similarly, children who watch models who were persistent in the face of difficulty versus those who succeeded easily showed increased self-efficacy and increased motivation (Zimmerman & Ringle, 1981).

Applied to communication, the results suggest that if students watch a poor communicator struggle with communication and then succeed, the students will have increased self-efficacy towards communication and increased communication mindset. Simultaneously, the students will be able to witness the behaviors and effort that are necessary to increase communication skills, as well as witness a better speech delivery overall.

In order to develop the video intervention, an actor with extensive public experience was hired. The actor was given a rough outline for an explanatory speech, similar to the type that would be seen in an introductory communication course. The actor was then instructed to deliver the speech without any preparation. This first attempt was filmed. Next, the actor was given forty-five minutes to improve the speech, and was specifically instructed to engage in the behaviors (i.e. repetition, practicing out loud) which interview participants had mentioned, engage in the verbal utterances of frustration used in the Schunk and Hanson (1985) study, as well as mention the muscle growing

metaphor. Finally, the actor was filmed again for the “final” version of the speech. Since participants had specifically focused on physical and verbal delivery as key elements of “good” communication skills, the actor was told to make clear improvements in those areas.

To summarize, all three interventions contained an identical message:

Communication skills, like a muscle, can be grown with time and effort. The text intervention required students to read a 6-paragraph description elaborating on the metaphor and explaining how neurons in the brain grow and change to help new skills develop. In contrast, the activity intervention contained 1 paragraph with a mention of the muscle metaphor, and then instructed the student to describe a time that they improved their own communication skills. The message (muscle metaphor) was explained identically to the text intervention, but the difference was that students were asked to use their own experience and history to affirm that metaphor as true. Finally, in the video intervention, the same muscle metaphor was presented as text at the beginning of the video. However, the key difference in the video metaphor was that it provided modeling – demonstrating not only visual evidence of a speech improving, but also modeling how that improvement might occur.

Before discussing phrase two of the intervention, it is important to acknowledge the limitations of this study. One primary limitation was the limited number of interview participants. Only eleven participants were interviewed, and a majority of those participants were female. It is possible that with more perspectives, different findings regarding communication skills and mindset could have emerged. Additionally, the

interviews were conducted during the first two weeks of the course, but it is possible that messages from instructors could have already influenced students' perspectives before they engaged in the interview.

Phase Two: Intervention Testing

In phase two, the three intervention formats which had been developed (text, activity, and video) were pilot tested for initial effectiveness.

Method

Recruitment

Recruitment for the study was conducted using Amazon's Mechanical Turk. The recruitment message specified that only college students were eligible to participate in the survey, and restrictions were set using the Amazon Mechanic Turk software to ensure all participants were between the age of 18-25. The participants were told the intent of the survey was to gather opinions about communication skills.

Participants

A total of 178 students completed the survey. Of those, 15 were deleted because they failed either the attention or manipulation check, leaving 163 responses. Another 10 were deleted because they answered "no" when asked if they were currently enrolled in college, leaving a final sample of 153.

The average age of participants was 19 ($SD = 1.27$). A total of 46 (30.1%) of students were freshman, 41 (26.8%) of students were sophomores, 40 (26.1%) of students were juniors, and 18 (11.8%) of students were seniors. An additional 8 (4.6%) reported

they were a non-degree seeking student. Participants were also asked about their race/ethnicity. The most students identified as White/Caucasian (49%, $N = 75$), followed by Asian (32%, $N = 49$), followed by Black or African American (14%, $N = 21$), followed by Hispanic or Latino (5%, $N = 8$). In addition, 5 students selected “other,” and 2 students identified as Native Hawaiian or Pacific Islander, 2 students identified as Middle Eastern / North African, and 1 student identified as American Indian or Alaskan Native. Approximately half the sample identified as male ($N = 79$, 52%) and half as female ($N = 71$, 46%), and 3 students preferred not to disclose.

Procedure

The entire pilot test was conducted using the online survey software Qualtrics. Participants were asked to read and agree to the statement of informed consent. After consenting, the first portion of the study asked participants to fill out the initial mindset measure. Next, participants were randomly assigned to one of the three communication mindset intervention forms or a control condition. A total of 41 students (27%) were given the text condition, 38 (25%) were given the video condition, 36 (24%) were given the activity condition, and 38 (25%) were given the control condition.

After the intervention, participants were asked a manipulation check question to ensure they were paying attention. At that time, participants also answered an open-ended question asking what they thought of the intervention. Finally, participants were asked to report demographics and repeat the communication mindset measure. All procedures were reviewed and approved by the Institutional Review Board.

Measures

Communication Mindset

The Communication Mindset (CM) Scale (Nordin & Broeckelman-Post, 2019) uses eight items to measure students' implicit beliefs about whether communication skills can be improved. Items include statement such as, "You have a certain amount of communication skills, and you can't really do much to change it" and "You can always substantially change how well you can communicate." Each item is answered on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). A score of 1 indicates fixed mindset and a score of 7 indicates growth mindset. Reliability in previous research was high ($\alpha = .88$; Nordin & Broeckelman-Post, 2020). In the pre-course survey, mindset had a reliability of $\alpha = .88$ and in the post-course survey the reliability was $\alpha = .89$.

Results

First, the role of demographic characteristics was briefly examined. In previous studies, male students, students for whom English was not a first language, and Latino students had significantly lower mindset than their peers (Nordin & Broeckelman-Post, 2020). Ideally, a MANOVA would be conducted which included these demographic variables as between-subjects factors in order to test for their impact. Unfortunately, a sample size of only 153 distributed among the four conditions with the addition of demographic characteristics would not leave enough cases per cell for this analysis to occur.

Instead, Chi-square tests of homogeneity were conducted to determine if each of these three demographic groups were equally distributed among conditions. For gender and race/ethnicity, participants were equally distributed among conditions. However, students of different language status were distributed unevenly, $\chi^2 (3, N = 150) = 7.83, p = .05$. Of the 44 students who said English was not their first language, 25% ($n = 11$) were in the text condition, 27% ($n = 9$) were in the video condition, 16% ($n = 7$) were in the control condition, and 39% ($n = 17$) were in the activity condition. A follow-up t -test confirmed a significant difference in mindset scores by language status at both time one [$t(148) = 2.76, p = .007$,] and time two [$t(148) = 3.32, p = .001$], with students who reported English was not their first language scoring significantly lower ($M_1 = 4.75, SD_1 = .92, M_2 = 4.78, SD_2 = .94$) than students who reported English was their first language ($M_1 = 5.28, SD_1 = 1.14, M_2 = 5.44, SD_2 = 1.16$). As a result, language status was included as a covariate in the main analysis.

A within-subjects MANOVA with one between-subjects factor (condition) and language status as a covariate was conducted to determine if the different forms of the mindset intervention had an effect on communication mindset. Univariate tests of within-subjects effects showed that there was a significant main effect for time for communication mindset [$F(1, 148) = 3.81, p = .009, \eta_p^2 = .03, \text{power} = .75$]. The interaction between time and language status approached significance [$F(1, 148) = 3.49, p = .06, \eta_p^2 = .02, \text{power} = .46$]. No interaction was found between time and condition. A significant between-subjects effect was found for language status [$F(1, 148) = 7.82, p = .006, \eta_p^2 = .05, \text{power} = .79$]. In addition, a between-subjects difference was found by

condition [$F(4, 1007) = 4.06, p = .000, \eta_p^2 = .07, \text{power} = .84$]. The students in the activity intervention had lower mindset scores than the control group in both pre-test and post-test ($p = .054$). In addition, planned comparisons indicated a statistical difference between the change in scores for the activity group in comparison to the control group, $p = .009$. In all three intervention conditions, mindset scores increased across time, but in the control condition, mindset slightly decreased. See Table 1 for details.

Table 1. Pilot Test Communication Mindset Scores

Table 1. Pilot Test Communication Mindset Scores

	Pre-Test		Post-Test		Change
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	
Text	5.25	.16	5.41	.17	.17
Video	5.21	.17	5.41	.18	.21
Activity	4.66	.18	4.91	.18	.25
Control	5.34	.18	5.27	.18	-.07

Discussion

The first major finding of this study is that the activity intervention significantly increase mindset compared to the control group. This provides tentative support for the ability of an intervention to increase communication mindset. However, the low scores of

the activity group must be taken into account. Even after controlling for language status, the activity group had significantly lower mindset scores than the other groups. The success of this group is then interesting, because in previous mindset literature, the students with the lowest mindset scores benefit most from the growth muscle intervention message (Aronson et al., 2002).

It is also possible that the other three groups were experiencing a ceiling effect. The mean mindset score at the beginning of the intervention for the control, video, and text group was above 5 out of a possible 7. Since the activity intervention group had the lowest overall mindset score to begin with, they could have experienced the highest jump in mindset scores simply because they actually had room to improve.

It is possible that the subjective nature of communication that students identified was one reason that the activity intervention was more powerful. While the video and text intervention followed traditional mindset literature in describing (and showing) the possibility that communication skills could be improved, the activity intervention invoked students' own experience, essentially demonstrating that communication skills could be improved for that student specifically. The traditional mindset scales that are used in the majority of research are generalized, in that items describe the possibility that the skill can generally be improved by anyone. However, more recently, some scales have been developed that invoke-first person language and specify that the participant *themselves* can improve the skill. Future research, particularly in communication mindset, should seek to determine if there is an individual-based component to mindset.

One additional point of hope within the findings is in the actual mean scores of the conditions before and after exposure to the intervention. Students in all intervention conditions showed increases in mindset, whereas students in the control condition actually showed a slight decrease in mindset. The statistical power was low throughout the between-subjects and interaction analysis, meaning the probability of a type II error ranged from 40-60% in these areas. Thus, it is possible that more version of the mindset intervention are making an impact that could not be detected in the present study.

It is important to note several critical limitations of this pilot test. First, the participants were recruited through Amazon Mechanical Turk, so although they reported their own age and enrollment to be correct for the study, there is no way of confirming they truly are college students. In addition, even if the information reported is true, the sample is not entirely representative of the target intervention population. Students who take the introductory communication course are majority freshman (Morreale et al., 2016), but only 30% of the students within this study were freshman.

A second critical limitation lies in the timing of the measurement. The participants took the measurements directly before and directly after the intervention, but the intervention itself likely only took 5-10 minutes to complete. This may not have given students enough time to truly process the mindset message, and it does not allow any longitudinal perspective on how the intervention message impacts students over time. Future studies should include a longitudinal component in order to determine if participating in a mindset intervention has any impact over time.

Conclusion

The purpose of this study was to develop and pilot test a communication mindset intervention for students in the introductory course. Although the development was successful, the pilot test failed to clearly indicate that the intervention was successful in improving communication mindset. Future research should seek to re-test the intervention, ideally in a situation which removes the key methodological problems which may have limited this study.

CH. 4: INTERVENTION TEST AND LONGITUDINAL RESULTS

Introduction

In her 2014 Ted Talk, Dr. Carol Dweck spoke on a concept she called “the power of yet.” Dweck told the story of a school in Chicago, where instead of receiving failing grades, students would be given the grade “not yet.” The difference between “no” and “not yet” is a critical one, and one that Dweck argues is the fundamental difference between students who hold two different “mindsets” (Dweck, 2006, p. 200). Students with a growth mindset believe that personality traits, such as intelligence or communication skills, can be improved with time and effort (Dweck, 2006). Students with a fixed mindset believe the opposite – that personality traits are fixed, genetic qualities that exist outside of personal control (Dweck, 2006). These mindsets are most salient in three key situations: academic situations which induce high levels of stress (Dweck et al., 1995), situations which include external evaluation or judgement (Elliott & Dweck, 1988), and situations where evaluation is seen as ambiguous or difficult to predict and control (Dweck & Reppucci, 1973).

The introductory communication course sits at the intersection of all three of these situational factors. First, the introductory communication course is an academically stressful situation. Approximately 88% of universities offer an introductory communication course that either focuses on or includes a public speaking element, and 80% of campuses require this course as a part of the general education curriculum (Morreale et al., 2016). Public speaking is the most common fear in America (Dwyer &

Davidson, 2012), and the national average score for the PRPSA (Personal Report of Public Speaking Anxiety) is 114.6, which falls into the “moderately high anxiety” group. Thus, it is logical to assume the majority of students will likely experience public speaking anxiety in an academic public speaking course.

Second, the introductory course involves evaluation. The majority of four-year and two year schools require between one and four speeches as part of the introductory course curriculum (Morreale et al., 2016). However, this evaluation could be perceived by students as ambiguous for a number of reasons. First, 69% of introductory courses use assessment instruments developed by individual instructors (Morreale et al., 2016). This is not to say any of those assessments are invalid, but rather to point out the lack of a universal standard of competence when it comes to public speaking and communication skills (Schreiber et al., 2012). Regardless of whether public speaking evaluation is truly ambiguous or not, studies show that individuals with high public speaking anxiety spend more time worrying about evaluation than those with lower public speaking anxiety (Beatty, 1988b). Content analysis has shown that the majority of worries reported by students’ regarding public speaking assignments revolve around external fears (such as evaluation) rather than internal fears (such as performance; LeFebvre et al., 2018).

Because of these three characteristics, the introductory public speaking course is a key area where mindset could be playing a large role in student performance. This has been supported by previous studies, which show that mindset towards communication skills and public speaking skills successfully predicts student public speaking anxiety, grades, and engagement in the course (Nordin & Broeckelman-Post, 2019; Stewart et al.,

2019). In a previous study, an intervention designed to increase communication mindset was developed and pilot tested. Although it showed minimal evidence of success with individuals outside the basic course, it is possible that the intervention will be more effective for students for which communication skills are more directly relevant: students in the introductory course.

Thus, the present study has three aims. First, this study will re-test the communication mindset intervention with introductory course students. Second, this study will test to see if the intervention is impacting two additional and relevant constructs, public speaking anxiety and communication self-efficacy. These two variables were selected because they fall under one of the key competencies established for the introductory course: the ability to accomplish communicative goals (Engleberg et al., 2017). PSA and self-efficacy have been specifically recommended as constructs which can help measure this competency within the introductory course (Broeckelman-Post et al., 2020). Finally, this study will gather longitudinal data to determine if the study has any impact on students at the end of the introductory course.

Literature Review

Public Speaking Anxiety

Public speaking anxiety is a relevant construct in relationship to a many different elements of the introductory course. Before students even enroll PSA can influence the choices students are making. In one study, students with higher PSA were more likely to enroll in a hybrid rather than public speaking focused course format (Broeckelman-Post,

Hyatt-Hawkins, et al., 2020). The amount of PSA students report at the beginning of a course is also related to demographic characteristics. Female students often have higher PSA than male students (Broeckelman-Post & Pyle, 2017; Hunter et al., 2014; McCroskey, 1984; Nordin & Broeckelman-Post, 2019). Students for whom English is not their first language sometimes report higher public speaking anxiety (Burroughs et al., 2003). However, in other studies, no differences in were found based on language in mainstream classes (Broeckelman-Post, 2019; Suwinnattichaiorn & Broeckelman-Post, 2016). Further, any differences in PSA among students have shown to have no impact on actual measures of performance (Broeckelman-Post, 2019; Suwinnattichaiorn & Broeckelman-Post, 2016). Overall, PSA measured at the beginning of a course is unrelated to verbal performance during speeches (King & Finn, 2017) and fails to predict end of course grades (Dwyer & Fus, 2002).

Pre-course levels of PSA have been a focus of research because the reduction of public speaking anxiety is often studied as a goal of the introductory course. Both public speaking focused and hybrid course formats successfully reduce public speaking anxiety (Hunter et al., 2014), with no meaningful difference in the amount PSA reduction in each format (Broeckelman-Post, Hyatt-Hawkins, et al., 2020; Broeckelman-Post & Pyle, 2017). One study found that as students public speaking related fears at the end of the course, when PSA was lower, differed from the content of their fears at the beginning of the course (i.e. memory glitches, judgement, stuttering, etc; LeFebvre et al., 2020). Students report more reduction in PSA at the end of the semester when they perceive a more connected classroom climate (Sidelinger et al., 2011).

Finally, PSA is deeply connected to students' perceptions of their own abilities in the classroom. End of course perceptions of communication competence were predicted by beginning of course levels of PSA (Sidelinger et al., 2011). At the end of the course, PSA is also correlated with self-reports of interpersonal communication competence (Nordin & Broeckelman-Post, 2019). Students narratives of success in the introductory course often focus on decreased speaking anxiety as an outcome of the course which helped them feel more confident and competent in communication settings (Anderson et al., 2019). These studies clearly demonstrate that PSA is a relevant, and critical, subject of study in the introductory communication course.

Communication Self-Efficacy

Self-efficacy in the introductory course is related to student outcomes. One study found that while there was no relationship between beginning of course communication apprehension and end of course grade, the one factor which could predict end of course grade was students' reported self-efficacy at the mid-semester point (Dwyer & Fus, 2002). However, the opposite relationship has also been found, in which receiving a good grade on a speech appeared to be associated with an increase in public speaking self-efficacy (Frey & Vallade, 2018).

Students experience during the introductory course is also impacted by self-efficacy. Students with high self-efficacy expectations have more positive affect towards public speaking assignments and less public speaking anxiety (Lucchetti et al., 2003). Self-efficacy is also positively correlated with self-esteem and negatively correlated with

all four dimensions of communication apprehension (group, interpersonal, meeting, and public speaking; (Daly & Thompson, 2017).

Finally, improving self-efficacy is a goal of the introductory course. Limited research has actually measured self-efficacy changes as a result of the introductory course. Two studies that have specifically examined self-efficacy before and after the introductory course did provide support that self-efficacy is improving (Dwyer & Fus, 2002; Nordin & Broeckelman-Post, 2020). Additionally, self-efficacy is inversely related to communication apprehension, which decreases as a result of the introductory course (Daly & Thompson, 2017; Dwyer & Fus, 2002; Lucchetti et al., 2003). Other constructs which increase as a result of the introductory course, including communication competence, are also related to self-efficacy (Dwyer & Fus, 2002).

Justifying Communication Mindset

Communication mindset is an individuals' belief regarding whether or not communication skills can be improved (Nordin & Broeckelman-Post, 2019).

Communication mindset is more predictive of student engagement in the introductory course than public speaking anxiety, and is highly correlated with speech grades (Nordin & Broeckelman-Post, 2019). Since years of research on mindset theory has supported the idea that a strategic intervention can improve student mindset (Aronson et al., 2002; Blackwell et al., 2007; Paunesku et al., 2015; Yeager et al., 2016), communication mindset was chosen to be the target of an intervention for introductory course students.

Besides only measuring changes in mindset, this study will look for changes in levels of student PSA and self-efficacy.

These three variables (mindset, PSA, and self-efficacy) are similar on a surface level, but different in ways that matter. Communication self-efficacy is a students' perception of their ability to execute the behaviors needed to communicate effectively. In contrast, mindset is a students' judgement of whether or not they can change and improve those behaviors in order to communicate more effectively in the future. PSA, however, is more concerned with anxiety experienced by students within those communication situations. Together, these three variables can offer insight on the cognitions students experience in relation to introductory course performance and are thus all included as outcome measurements for this intervention study.

In a previous study (the previous chapter), a communication mindset intervention was built and pilot tested, which showed some (although limited) efficacy in improving students' mindset scores. One of the intervention conditions (the video condition) showed significant improvement in comparison to the control condition. Replication of this pilot data is the basis for the first hypothesis:

H1: Communication mindset scores will increase after exposure one of the three intervention conditions as compared to the control condition.

In addition, because of previous studies which have shown mindset's positive relationship with communication self-efficacy and negative relationship with PSA (Nordin & Broeckelman-Post, 2020), two additional hypotheses are proposed:

H2: Communication self-efficacy scores will increase after exposure to one of the

three intervention conditions.

H3: Public speaking anxiety will decrease after exposure to one of the three intervention conditions.

This study will also seek to detect any meaningful differences in effectiveness of the different intervention formats. Because the pilot study offered no evidence of these differences, this study will use the following research questions:

RQ1: Do the intervention types differ in their effectiveness at improving communication mindset?

RQ2: Do the intervention types differ in their effectiveness at improving communication self-efficacy

RQ3: Do the intervention types differ in their effectiveness at reducing PSA?

Finally, this research uses additional longitudinal data (gathered at the end of the semester) in order to test the final research question:

RQ4: Do the effects of the mindset intervention hold through the end of the introductory communication course?

Method

To test the efficacy of a communication mindset intervention, data was gathered at three points. All students enrolled in the introductory course at a large, diverse, mid-Atlantic public university were asked to complete a post-course survey for credit. Since these students are actually participating in an introductory communication course, they represent a better sample than the previous study which used Amazon's Mechanical

Turk. Further, the university is not a primarily white institution, increasing the likelihood of a diverse sample of students.

Students were able to opt-out of participating in the study, and if so, their data was deleted from the dataset. Additionally, during the course, students are asked to participate in research opportunities for credit. One of the available opportunities was the mindset intervention. Data was gathered before and after the intervention was administered. During each of these three points of data-gathering, students provided their first and last name and student identification number. The datasets were then merged using this student identification number.

This set-up allowed the three key variables (mindset, self-efficacy, and public speaking anxiety) to be measured at three unique points in time: before the student was exposed to the intervention (T1), directly after exposure (T2), and at the end of the course (T3). Although the students were enrolled across multiple sections with multiple instructors, all instructors participate in the same training and the content of the course is identical across sections.

Each of the three datapoints contained an attention check. The students who participated in the mindset intervention were randomly assigned to one of three intervention formats (text, video, and activity) or a control condition. After the intervention activity, the participants were asked the question “Which of these metaphors was discussed in the previous page on the study?” as a manipulation check. Any students in the intervention conditions who did not correctly identify the “muscle metaphor” that was referenced in all three intervention formats were removed from the dataset, and

anyone in the control condition who did not select “none of the above” was removed. The video, activity, and text formats had been pilot tested in a previous study.

Participants

Demographic data was gathered after students completed the mindset intervention measures. A total of 357 participants completed the study, but only 291 passed all attention checks and manipulation check and were retained for analysis. The average age of participants was 19.90 years ($SD = 4.83$). 139 (46%) identified as male, 157 (52%) identified as female, one student identified as transgender, and 8 said they preferred not to disclose. The majority of students were freshman ($N = 135$, 44.3%), followed by sophomores ($N = 89$, 29.2%), juniors ($N = 50$, 16.4%), and seniors ($N = 31$, 10.2%).

Students were asked to report their race/ethnicity and could indicate more than one response. Of the total number of students, 3 (1%) identified as American Indian/Alaskan Native, 100 students (32.8%) identified as Asian, 40 students (13.1%) identified as Black or African American, 29 students (9.5%) identified as Hispanic or Latino, 22 (7.2%) of students identified as Middle Eastern or North African, 3 students (1%) identified as Native Hawaiian or Pacific Islander, and 128 (42%) identified as White or Caucasian. Finally, students were asked about their familiarity with English. The majority of students ($N = 183$, 60%) said English was their first language and were classified as L1 students. 91 students (30%) said they learned a language other than English as their first language but went to an English speaking school and were classified as Gen 1.5 students (Thonus, 2003), and 24 (7.9%) reported being more comfortable speaking another language and were classified as L2 students (Thonus, 2003).

Students were randomly assigned to one of the four conditions. The text condition had 71 participants (24.3%), the video condition had 72 (24.7%), the activity had 74 (25.3%), and the control condition had 74 (25.3%). Because previous research indicates differences in mindset levels occur across demographic variables including gender and language status, chi-square tests were conducted to check if students were equally distributed among the conditions. Additionally, a chi-square test was conducted to see if academic class was distributed evenly across conditions. The chi-square tests for gender [$X^2(12, N = 291) = 7.39, p = .83$], class [$X^2(9, N = 291) = 22.97, p = .66$], and language status [$X^2(3, N = 291) = 8.85, p = .18$] were insignificant, indicating even distribution among conditions.

Measures

Communication Mindset

The CM Scale (Nordin & Broeckelman-Post, 2019) uses eight items to measure students' implicit beliefs about whether communication skills can be improved. Items include statement such as, "You have a certain amount of communication skills, and you can't really do much to change it." Each item is answered on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). A score of 1 indicates more of a fixed mindset and a score of 7 indicates more of a growth mindset. Reliability in previous research was high ($\alpha = .88$; Nordin & Broeckelman-Post, 2020). The mindset scale had a reliability of $\alpha = .88$ during T1, $\alpha = .89$ during T2, and $\alpha = .89$ during T3.

Communication Self-Efficacy

Efficacy towards communication skills was measured with eight items that were all rated on a Likert scale of “strongly disagree” to “strongly agree,” all of which were adapted from Chen, Gully, & Eden’s (2001) General Self-Efficacy Scale. The items included statements such as, “I believe I can succeed at most any communication endeavor to which I set my mind,” and, “Even when things are tough, I can communicate very well.” The reliability for this scale was high with a reliability of $\alpha = .89$ at T1, $\alpha = .88$ at T2, and $\alpha = .93$ at T3.

Public Speaking Anxiety

PSA was measured using the Personal Report of Public Speaking Anxiety (PRPSA; McCroskey, 1978) which contains 34 items answered using a five-point Likert scale. A score of one indicates less anxiety, and a score of five indicates more anxiety. This scale includes items such as “I get anxious when I think about a speech coming up,” and, “I do poorer on speeches because I am anxious.” The measure normally has reliability above $\alpha = .95$ (McCroskey, 1978), and in this study had a reliability of $\alpha = .96$ at T1, $\alpha = .97$ at T2, and $\alpha = .97$ at T6.

Results

Immediate Effects

First, data from the intervention only (T1 and T2) was analyzed. A within-subjects MANOVA with one between-subjects factor (condition) was conducted to determine if the intervention had any impact on communication mindset, communication

self-efficacy, and public speaking anxiety scores. Since there were only two measures for time, Mauchly's Test of Sphericity could not be calculated, so values for Sphericity Assumed were used. Multivariate tests of within-subjects effects showed that there was a significant interaction effect for time by condition, $F(9, 861) = 3.23, p = .001, \eta_p^2 = .03$, power = .98, as well as a significant main effect for time, $F(3, 285) = 9.60, p = .000, \eta_p^2 = .09$, power = .99. Between-subjects effects were not significant for condition, $F(9, 861) = 0.137, p = .99$.

Communication Mindset

For communication mindset, there was a significant interaction effect between time and condition, $F(1, 287) = 8.08, p = .000, \eta_p^2 = .08$, power = .99. Additionally, there was a main effect for time [$F(1, 287) = 22.79, p = .000, \eta_p^2 = .07$, power = .99], but no main effect for condition [$F(9, 861) = 3.23, p = .001, \eta_p^2 = .03$, power = .98]. Profile plots can be found in **Error! Reference source not found..**

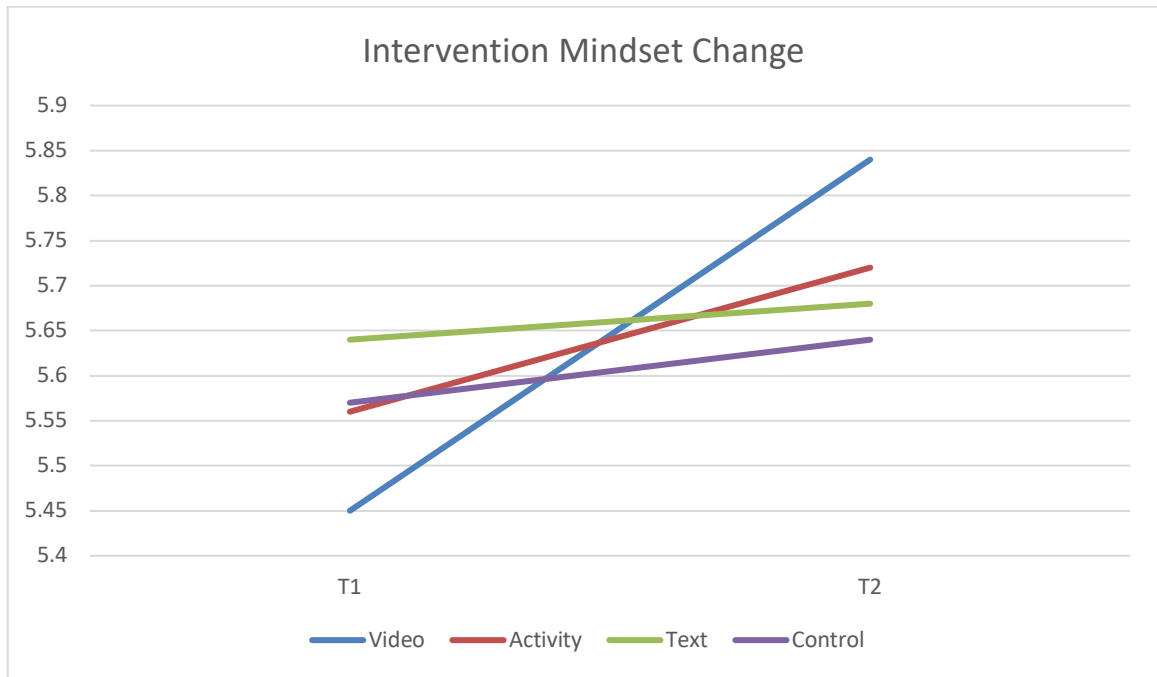


Figure 1. Intervention Mindset Change

In order to probe the main effect, a within-subjects ANOVA was conducted on each condition separately to determine which of the conditions were contributing to the main effect that was found for time. Scores of students in the control condition [$F(1, 73) = 2.23, p = .91, \eta_p^2 = .00, \text{power} = .05$] and text condition [$F(1, 70) = 2.23, p = .58, \eta_p^2 = .02, \text{power} = .18$] did not change significantly between time one and time two. However, in comparison to the control condition, mindset scores significantly changed over time for students in both the activity [$F(1, 73) = 5.37, p = .07, \eta_p^2 = .02, \text{power} = .63$] and video condition [$F(1, 71) = 40.80, p = .00, \eta_p^2 = .37, \text{power} = 1.0$].

Communication Self-Efficacy

There was a significant interaction effect between time and condition on communication self-efficacy, $F(3, 287) = 3.21$, $p = .02$, $\eta_p^2 = .03$, power = .74.

Additionally, there was a main within-subjects effect for time [$F(1, 287) = 5.91$, $p = .01$, $\eta_p^2 = .02$, power = .68], but no main between-subjects effect for condition [$F(3, 287) = .02$, $p = .99$, $\eta_p^2 = .00$, power = .05]. Profile plots can be found in **Error! Reference source not found..**

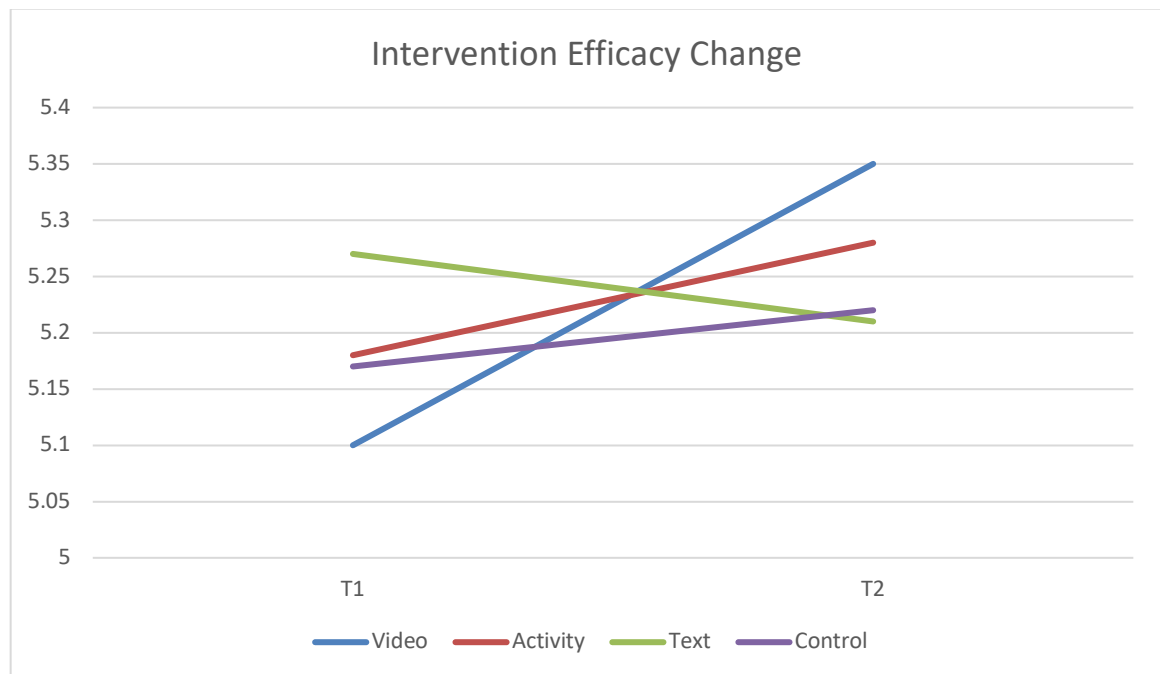


Figure 2. Intervention Efficacy Change

To probe the interaction, four within-subjects ANOVAs were conducted (one on each condition) to determine if each scores within each condition changed between time one and time two. Students self-efficacy scores did not significantly change if they were in the control condition [$F(1, 73) = .65, p = .42, \eta_p^2 = .00, \text{power} = .13$], text condition [$F(1, 73) = .54, p = .46, \eta_p^2 = .01, \text{power} = .11$], or activity condition [$F(1, 73) = 2.1, p = .16, \eta_p^2 = .02, \text{power} = .29$]. Students in the video condition significantly increased their communication self-efficacy between time one and time two [$F(1, 73) = 11.60, p = .001, \eta_p^2 = .14, \text{power} = .92$].

Public Speaking Anxiety

For public speaking anxiety, there was a within-subjects main effect for time [$F(1, 287) = 7.07, p = .008, \eta_p^2 = .02, \text{power} = .75$]. In all conditions, participants' public speaking anxiety dropped between time one and time two, as depicted in **Error!**

Reference source not found.. There was no between-subjects effect for condition (1, 287) = 22.79, $p = .89, \eta_p^2 = .00, \text{power} = .11$] or interaction effect (1, 287) = 22.79, $p = .76, \eta_p^2 = .00, \text{power} = .13$].

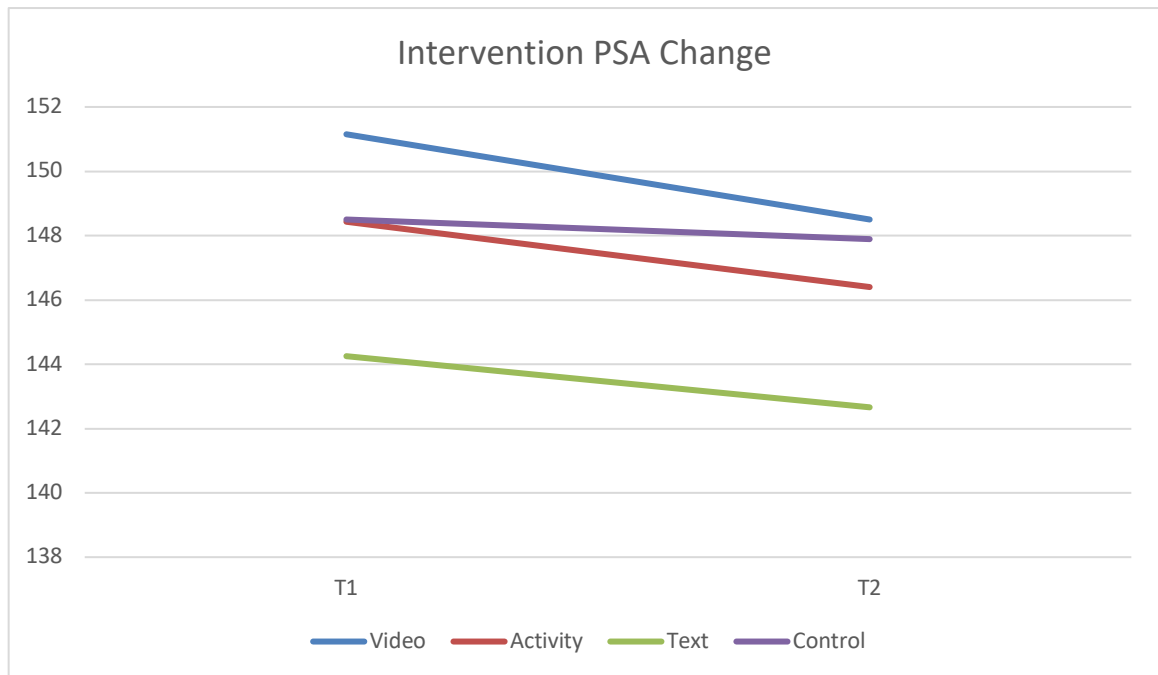


Figure 3. Intervention PSA Change

Delayed Effects

The post-course survey was then merged with the intervention dataset to test for delayed effects of the intervention. A within-subjects MANOVA with one between-subjects factor (condition) was conducted to determine if the intervention had any impact on communication mindset, communication self-efficacy, and public speaking anxiety scores. Mauchly's Test of Sphericity was significant for all three dependent variables, so values for Greenhouse-Geisser were used for within-subjects analysis. Multivariate tests

of within-subjects effects showed that there was a significant interaction effect for time by condition, $F(18, 642) = 1.91, p = .013, \eta_p^2 = .05, \text{power} = .98$. There was a significant main effect for time, $F(6, 227) = 14.13, p = .00, \eta_p^2 = .27, \text{power} = 1.0$. Between-subjects-effects were not significant for condition, $F(9, 696) = .26, p = .99, \eta_p^2 = .00, \text{power} = .14$.

Communication Mindset

Univariate tests showed a significant interaction effect for time by condition on communication mindset, $F(4.62, 464) = 2.82, p = .01, \eta_p^2 = .03, \text{power} = .82$, as well as a significant main effect for time, $F(1.54, 227) = 8.94, p = .00, \eta_p^2 = .04, \text{power} = .94$. However, between-subjects-effects were not significant for condition, $F(3, 232) = .19, p = .91, \eta_p^2 = .00, \text{power} = .08$. Post-hoc tests using the Bonferroni correction revealed that on average, mindset significantly increased by an average of .19 between time one and time two ($p = .000$), but significantly decreased by an average of .16 between time two and time three ($p = .012$). The profile plot is shown in **Error! Reference source not found..**

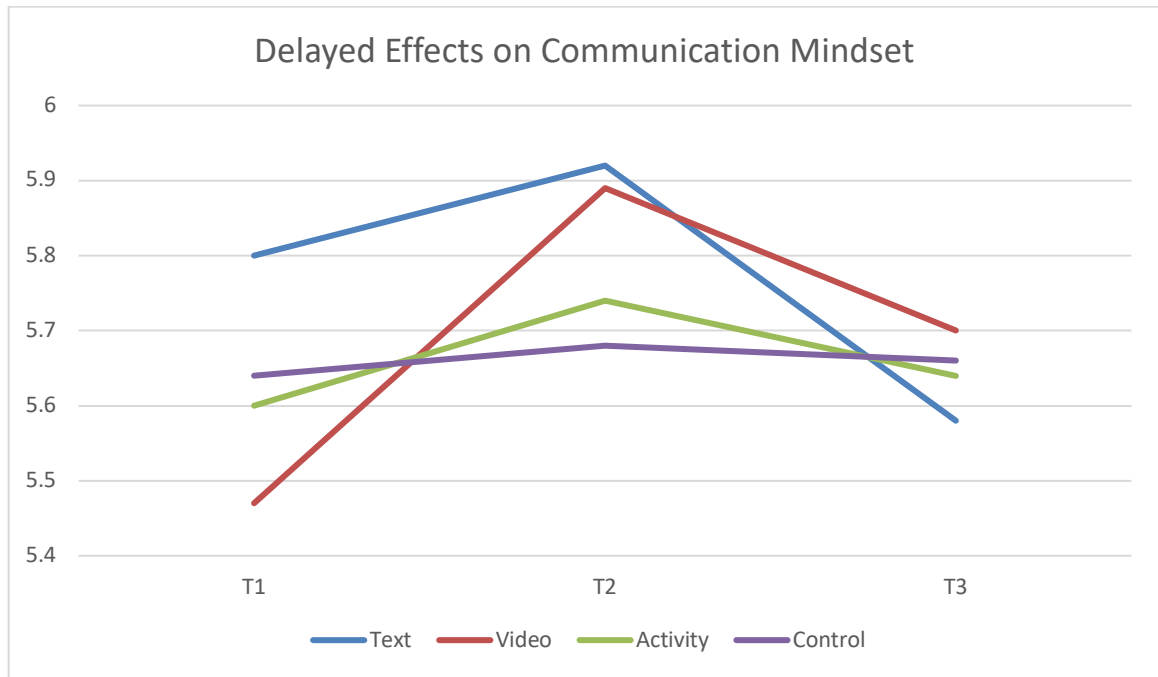


Figure 4. Delayed Effects on Communication Mindset

To probe the interaction effect and determine if participants in each condition followed the overall trend in time, a separate within-subjects ANOVA was conducted on each group. In the control group, there was no significant change over time, $F(2, 56) = .29$, $p = .75$, $\eta_p^2 = .01$, power = .09. In the text group, there was no significant change between time one and time two, $F(1, 54) = 3.34$, $p = .07$, $\eta_p^2 = .05$, power = .43. There was a significant mindset score drop ($M = .33$), however, between time two and time three, $F(1, 54) = 9.96$, $p = .00$, $\eta_p^2 = .15$, power = .87. In the activity condition, there was no significant difference over time [$F(1, 64) = 1.29$, $p = .27$, $\eta_p^2 = .07$, power = .60],

although pairwise comparisons indicated the difference between time one and time two was approaching significance ($p = .08$).

In the video condition, students significantly increased their scores by an average of .42 between time one and time two [$F(1, 57) = 40.91, p = .00, \eta_p^2 = .41, \text{power} = 1.0$], and their mindset scores did not significantly drop over time between time two and time three [$F(1, 57) = 1.08, p = .10, \eta_p^2 = .04, \text{power} = .36$]. Pairwise comparisons further revealed that on average, mindset scores at time three were higher by .24 than mindset scores at time one, although the difference did not reach significance ($p = .1$). Together, these results suggest that while the mindset score increase from the video intervention was somewhat maintained over time, although it was not enough to be meaningfully different from the scores before the intervention.

Communication Efficacy

Univariate tests showed that overall, there was no significant effect for time on communication self-efficacy, $F(1.43, 331.96) = 1.43, p = .24, \eta_p^2 = .00, \text{power} = .31$. However, pairwise comparison did show that there was a significant increase in efficacy ($M = .09$) between time one and time two ($p = .04$). There was no interaction effect between time and condition, $(4.62, 297.013) = .87, p = .52, \eta_p^2 = .01, \text{power} = .34$, and no significant between-subjects-effects for condition, $F(3, 232) = .25, p = .86, \eta_p^2 = .00, \text{power} = .09$.

Public Speaking Anxiety

For public speaking anxiety, there was a significant main effect for time, $F(1.28, 331.96) = 28.57, p = .00, \eta_p^2 = .11, \text{power} = 1.0$. PSA dropped by an average of 2.17 between time one and time two ($p = .00$) and dropped again by an average of 6.97 between time two and time three ($p = .00$). There was no interaction effect between time and condition, $(3.84, 297.013) = .45, p = .77, \eta_p^2 = .01, \text{power} = .15$, and no significant between-subjects-effects for condition, $F(3, 232) = .25, p = .86, \eta_p^2 = .00, \text{power} = .09$.

Discussion

Overall, this study provided limited but promising support for the effectiveness of a communication mindset intervention. The following section will review the findings for each format, and then discuss public speaking anxiety as a whole.

The video format proved to be the most effective intervention. Not only did the video significantly increase mindset scores and self-efficacy scores between time one (directly before intervention administration) and time two (directly after), but the decrease between time two and time three (end of course survey) was not significant. Essentially, this finding indicates that some of the mindset and efficacy increases that occurred as a result of the intervention were able to be held over time.

The activity format had mixed results. Within the intervention study data, the activity intervention was able to significantly increase mindset and efficacy between time one and time two. However, the increase was not as sharp as that of the video group. Although students did not significantly decrease their scores between time two and time three, there was not a significant increase between scores between time one and time

three. This indicates that although the video intervention created a small, temporary increase in scores, that impact did not last over time.

The text format intervention failed to have an impact on mindset or self-efficacy. This is an interesting finding, as the text format was most directly similar to previous mindset interventions that have been proven successful (Aronson et al., 2002; Blackwell et al., 2007; Yeager et al., 2016). Predictably, students in the control group also did not significantly change in mindset or efficacy between time one and time two.

There are a few potential explanations for these findings. First, the video was a full eight minutes long. Although the activity was meant to take students a minimum of five minutes, many respondents included a very short letter that would not have taken as much time to write. The time spent on the intervention itself was not recorded through the study, so there is no way to tell how long each student spent on the intervention activities – but it is possible the video intervention simply spent the most time with the content. Future studies could request a longer letter using word count or time requirements, or attempt to stack the video and activity conditions, providing students with both an opportunity to witness and learn growth mindset towards communication through the video, and then personally reinforce that message through the activity. It also may be useful to start over with the intervention design. Part of design thinking is the revision process, and in the Yeager (2012) work, students were asked to evaluate the intervention after it was administered and offer feedback. The same strategy could be used with the current intervention. Using more interviews, along with more mental models interviews, might help in achieving additional insights on students' mental models surrounding

communication skills. Then, those insights could be used to alter and tailor a combined intervention that uses both video and an activity to promote mindset and incorporates any feedback the target population may offer.

Additionally, it is important to note that the students in the video condition had the lowest mindset scores at time one and saw the greatest increase in mindset. During the pilot test, the activity condition had the lowest mindset scores and saw the greatest increase in mindset. In previous mindset literature, interventions have impacted students with lower mindset scores more profoundly than they impact students with higher scores (Aronson et al., 2002). Future research should further investigate these differences, as interventions could be used to target students entering the introductory course with lower mindset scores in order to help put them on a more positive trajectory for success before the course even begins.

Finally, one interesting finding of the study was that public speaking anxiety dropped significantly between time one and time two, as well as between time two and time three. The drop between time two and time three is consistent with one previous study which measured PSA at multiple points in the course and showed that PSA drops steadily throughout the semester (LeFebvre et al., 2020). The drop between time one and time two seems to be some sort of test-retest effect. Since exposure therapy has been shown to successfully reduce public speaking anxiety (England et al., 2012), it is possible that simply being exposed to the items of the PRPSA scale during time one measurement could have impacted students' perceptions of the items during time two.

This study has a few limitations which should be discussed. First, the students were able to access the intervention as a “research credit” anytime throughout the semester. This is key, because the “time one” measurements actually encompass a wide range of time periods, from one week into the semester to one week left of the semester. Additionally, the time three measurements all occurred at the end of the course, and students’ feelings of anxiety or frustration surrounding grades or final group projects could be impacting the results. Future studies should administer the intervention perhaps as part of the curriculum itself in order to ensure all students are exposed to the mindset message at the same time. Similarly, students were able to choose which “research credit” they completed out of multiple options. Although the true nature of the experiment was disguised and it was instead presented as a “survey about communication skills,” word of mouth could have traveled regarding the true content of the experiment, or students could be opting-in to participate if they naturally had more interest or opinions about communication skills.

One additional limitation relevant to the differences between time two and time three is the possibility of course and instructor effects. Previous studies have demonstrated that the specific course within this research already functions as a PSA intervention (Broeckelman-Post & Pyle, 2017), which may explain the drop in PSA evident in these results. Also, although the course content and lectures are standardized, students work in small labs with instructors who could be enforcing mindset related messages differently. Teacher and student mindsets are often linked (Seaton, 2018), and both performance and mindset of undergraduate students has been shown to be

influenced by their instructors (Smith et al., 2018). Because this experiment did not control for instructor effects, it is possible that students in the activity group retained a higher mindset score because the teachers of those students were able to enforce the message throughout the rest of the semester. The role of teachers in shaping students' mindset towards communication has not yet been studied, but should be a subject of future research.

Conclusion

Overall, this study offered tentative support for the efficacy of a communication mindset intervention within the introductory communication course. Considering the link between mindset and speech performance as well as overall course success, a successful intervention could be a useful tool for educators to target and assist fixed mindset students at the beginning of the course. While educators in communication studies likely understand that communication skills can be improved, having the students on the same page could make a world of difference.

CH. 5: MODELING THE INTRODUCTORY COURSE

Introduction

The introductory communication course plays a key role in demonstrating the value of the communication studies discipline in higher education. With 80% of universities now requiring an introductory communication course as part of the general education curriculum (Morreale et al., 2016), communication studies department face increased pressure to consistently reinforce the value of the course as part of that curriculum (Allen, 2002). One of the key arguments used in this reinforcement is the idea that in many cases, the introductory communication course is one of the only courses in university curriculum designed to influence students' attitudes towards communication and their communication behaviors (Allen, 2002).

To support these arguments in favor of the communication discipline and introductory course, a large body of research has been conducted which assesses the positive outcomes of the introductory course. However, universities are not only interested in evaluating student performance and success, but also student engagement (Holmes, 2018). Student engagement, or the “amount of physical and psychological energy that the student devotes to the academic experience” (Astin, 1999, p. 519), is deeply connected with critical variables for higher education including student retention (Trowler, 2010) and plays a significant role in higher education assessment (Kuh, 2001).

Student engagement has been studied widely within instructional communication literature, particularly as an outcome of certain instructor communication behaviors

(Borzea & Goodboy, 2016; Broeckelman-Post et al., 2016; Dixson et al., 2017).

However, it has yet to be studied as a variable which can help explain *how* and *why* the positive outcomes of the introductory course are occurring. Thus, the purpose of this study is to examine the relationships between three groups of variables: student characteristics, student engagement types, and outcomes of the introductory course.

Together, these relationships will hopefully provide insight that can help specifically improve the introductory course and fulfill the critical aim of “carving out a niche space for the basic course within general education” that was recently discussed in *Basic Communication Course Annual* (Joyce et al., 2019, p. 24).

Literature Review

Student Engagement

Responding to a gap in instructional communication literature, Mazer (2012) set out to develop a theoretically driven mechanism of assessing students’ experience of forms of engagement within the classroom. Student engagement research is specifically important in the field of communication studies because of a historic emphasis on oral participation. In classes such as the introductory communication course, oral participation is seen as a key indicator of students’ engagement in a course. However, the relationship between oral participation and engagement is weak (Frymier & Houser, 2016).

Engagement through traditional means of oral participation in class is better predicted by communication apprehension in the classroom, which is experienced by 70% of students (Bowers, 1986). Students with higher CA, as well as lower academic related self-esteem,

tend to participate less (Morrison & Thomas, 1975). Thus, using oral participation as a measure for student engagement in the introductory course may not be an ideal choice.

Many ways have been established to measure engagement beyond oral participation. Mazer (2012) focused on measuring student engagement in alternative ways and, through a series of studies, scales for both student interest and student engagement were developed and confirmed as distinct from other similar constructs (Mazer, 2012). Whereas interest is a students' experience of being pulled towards a subject because of emotional or cognitive factors, engagement is conceptualized by Mazer as a series of more concrete behaviors, such as orally participating in class, taking notes, and asking questions (Mazer, 2013). Student engagement in communication courses specifically is related to emotional and cognitive interest (Mazer, 2013)

Similarly, Reeve (2012) argues that engagement is a multi-dimensional construct, composed of behavioral, emotional, cognitive, and agentic behaviors. While previous literature had generally formed a consensus that engagement was a combination of behavioral factors (i.e. paying attention, putting forth effort, persistence), cognitive factors (learning strategies, self-regulation), and emotional factors (interest, enthusiasm), agentic engagement was added to represent the students' contributions to the flow of instruction they receive, through behaviors such as expressing opinions and student-teacher communication (Reeve, 2012).

Predictors of Engagement

One construct which consistently predicts student engagement is a students' mindset (Tang et al., 2019). Mindset theory (Dweck, 2006; Dweck & Leggett, 1988) posits a distinction between students who believe ability is fixed and unchangeable and students who believe they can improve their abilities with time and effort. A students' mindset is one part of a larger network of adaptive motivational patterns which include engagement-related variables such as effort and interest and predict academic performance (Karlen et al., 2019). A 2019 meta-analysis of student engagement research between 2010 and 2018 found students self-belief and motivation (such as mindset) were key themes which predicted engagement (Zepke, 2019). Consistent with this meta-analysis, in a previous study focused on the introductory course, a students' communication mindset was found to predict student engagement (Nordin & Broeckelman-Post, 2019).

In the same study, public speaking anxiety was not a predictor of student engagement (Nordin & Broeckelman-Post, 2019). However, one review of studies from the last 50 years examining student "participation" in class (defined as preparation, contribution to discussion, group skills, communication skills, and attendance) found that communication apprehension was a significant predictor. Conclusions from research on more generalized academic anxiety are mixed, with some studies showing anxiety causes students to engage more with a course and some studies showing that anxiety predicts decreased engagement and increased avoidance (Pekrun & Linnenbrink-Garcia, 2012). Since these studies point to a possible relationship between PSA and engagement, and

because little research has directly studied that relationship, this study will include PSA as a predictor of student engagement in the proposed model. Additionally, experts on student engagement have suggested that future research examine potential interactions between predictors of engagement (Wang & Degol, 2014). Mindset is particularly salient in situations where high anxiety is present (Dweck & Reppucci, 1973), so this study hypothesizes an interaction effect between mindset and public speaking anxiety on student engagement.

Finally, one important predictor of student engagement is self-efficacy. A very stable, positive association exists between self-efficacy beliefs and the quantity of effort and persistence in academic settings (Linnenbrink & Pintrich, 2003). Across studies, all four dimensions of engagement proposed by Reeve (2012) have been discussed as related to self-efficacy. In college students specifically, self-efficacy predicts meaningful cognitive engagement, which is defined as “relating new information to one’s existing knowledge” (Walker et al., 2006, p. 4). Emotional engagement is predicted by students’ reported feelings of competence as well as having competence needs fulfilled (Park et al., 2012). Self-efficacy predicts behavioral engagement when measured by self-report but also when observed or objectively measured in experimental studies (Linnenbrink & Pintrich, 2003). No studies could be found which directly tested the relationship between self-efficacy and agentic engagement. However, agentic engagement was founded on the idea that students are active agents in their own learning – an idea which came directly from Bandura’s (1997) work on self-efficacy (Reeve & Tseng, 2011).

Results of Student Engagement

Besides being predictive of retention and a focus of assessment, student engagement also impacts students learning and lives. One review of studies from the past 20 years identified two key outcomes of student engagement: student engagement is an important facilitator and predictor of learning, and student engagement predicts grades and overall academic achievement (Finn & Zimmer, 2012). Although considerable research on the introductory course has attempted to find predictors of these two outcomes (learning and grades), little to no research could be found which examined the role of student engagement on outcomes of the introductory communication course.

Thus, the purpose of this study is to understand the ways in which the relevant cognitions that students hold when entering the introductory course (such as communication mindset, communication self-efficacy, and public speaking anxiety) influence student engagement in the introductory course and in turn influence course grade and critical learning outcomes. To do so, this study proposes a model of introductory course learning which incorporates the types of student engagement as mediators between student cognitions at the beginning of the course and those learning outcomes.

In the model, public speaking anxiety, communication efficacy, and communication mindset are used as predictor variables. These variables were all measured during the pre-course survey and are labeled T1 (time one). The four types of engagement (agentic, behavioral, cognitive, and emotional) are individually presented mediators in order to detect nuances in the way each different type of engagement may

influence changes during the introductory course. Finally, communication efficacy and public speaking anxiety measured at time two, along with students' final grades, function as outcome variables. It is important to note that paths between each variable's time one and time two scores will be included in the model, effectively shifting the time two measurement into a score that measures change in that variable. See Figure 5.

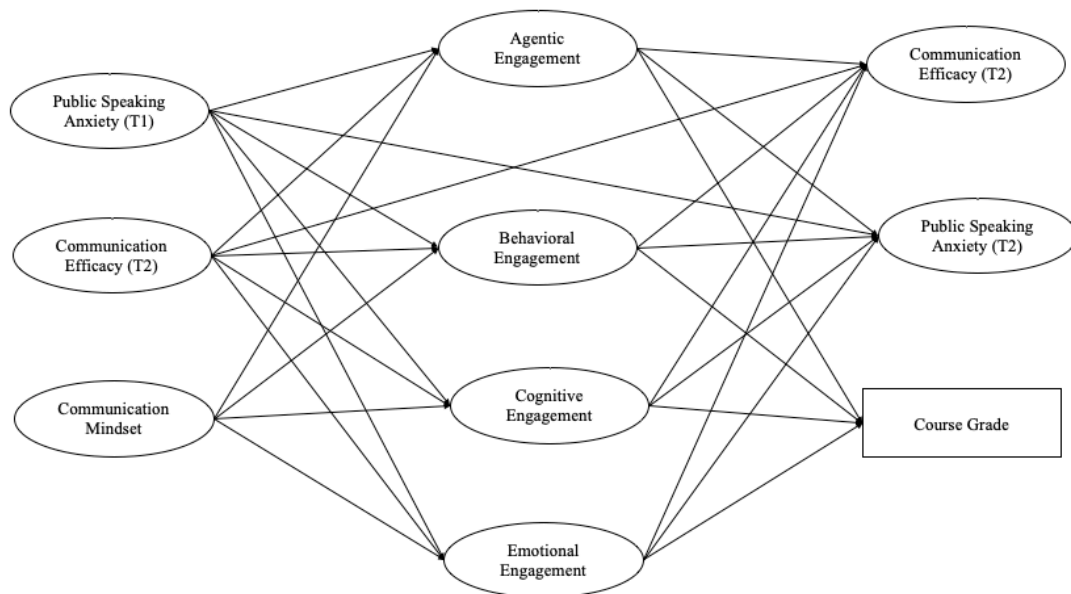


Figure 5. Introductory Course Learning Model

Method

Students in the introductory communication course at a large, mid-Atlantic university were asked to complete a pre-course survey and a post-course survey for credit. After the semester finished, the survey results were linked with each other and

with the gradebook using student identification numbers. All procedures were approved prior to the study by the Institutional Review Board.

Participants

Demographic information was gathered in the pre-course survey only. A total of 1540 students filled out the pre-course survey. Of those students, 743 (48%) identified as male, 765 (50%) identified as female, 3 identified as transgender, 11 selected “other”, and 18 said they preferred not to disclose. The majority of students were freshman ($N = 982$, 64%), followed by sophomores ($N = 325$, 21%), then juniors, ($N = 165$, 11%), then seniors ($N = 64$, 4%). The average age of the participants was 18.93 ($SD = 2.31$).

Students were asked to report their race/ethnicity and could indicate more than one response. Of the participants, 19 (1%) students identified as American Indian/Alaskan Native, 450 students (24%) identified as Asian, 203 students (11%) identified as Black or African American, 196 students (11%) identified as Hispanic or Latino, 140 (7%) of students identified as Middle Eastern or North African, 19 students (1%) identified as Native Hawaiian or Pacific Islander, and 663 (36%) identified as White or Caucasian.

Measures

Communication Mindset

The CM Scale (Nordin & Broeckelman-Post, 2019) uses eight items to measure students’ implicit beliefs about whether communication skills can be improved. Items

include statement such as, “You have a certain amount of communication skills, and you can’t really do much to change it.” Each item is answered on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). A score of 1 indicates more of a fixed mindset and a score of 7 indicates more of a growth mindset. Reliability in previous research was high ($\alpha = .88$; Nordin & Broeckelman-Post, 2020). In the pre-course survey, mindset had a reliability of ($\alpha = .88$) and in the post-course survey the reliability was ($\alpha = .89$).

Communication Self-Efficacy

Efficacy towards communication skills was measured with eight items that were all rated on a Likert scale of “strongly disagree” to “strongly agree,” all of which were adapted from Chen, Gully, & Eden’s (2001) General Self-Efficacy Scale. The items included statements such as, “I believe I can succeed at most any communication endeavor to which I set my mind,” and, “Even when things are tough, I can communicate very well.” The reliability for this scale was high with a pre-course reliability of ($\alpha = .89$) and a post-course reliability of ($\alpha = .93$).

Public Speaking Anxiety

PSA was measured using the Personal Report of Public Speaking Anxiety (PRPSA; McCroskey, 1978) which contains 34 items answered using a five-point Likert scale. A score of one indicates less anxiety, and a score of five indicates more anxiety. This scale includes items such as “I get anxious when I think about a speech coming up,” and, “I do poorer on speeches because I am anxious.” The measure normally has reliability above $\alpha = .95$ (McCroskey, 1978), and in this study had a reliability of $\alpha = .96$.

Student Engagement.

Engagement in the course (SE) was measured using the Reeve (2013) student engagement scale. Students answer 21 questions on a five-point Likert scale which represent engagement in the course. In this study, the individual subscales for the four subtypes of student engagement were used. Behavioral engagement describes how involved a student is in the learning process (Reeve, 2013). An example of a behavioral engagement item is, “When I’m in this class, I listen very carefully.” In this study, the behavioral engagement reliability was $\alpha = .85$. Agentic engagement is a student’s contribution to the flow of instruction they receive (Reeve, 2013). An example of an agentic engagement item is, “I let my teacher know what I need and want.” The agentic engagement reliability was $\alpha = .89$. Cognitive engagement refers to how strategically the student attempts to learn, and what strategies are used (Reeve, 2013). Cognitive engagement was measured with items such as, “When I study for this class, I try to connect what I am learning with my own experiences.” Cognitive engagement reliability was $\alpha = .86$. Finally, emotional engagement refers to positive emotions such as interest, and the absence of negative emotions such as anxiety. An example of an item measuring emotional engagement is, “This class is fun.” Emotional engagement reliability was $\alpha = .89$.

Results

In order to test the relationships between communication mindset, communication efficacy, public speaking anxiety, student engagement, and performance, this research used a Structural Equation Modeling (SEM) approach. SAS University Edition, version 8

of the SAS system for MAC was used for analysis in this study. Copyright © 2019 SAS Institute Inc. SAS and all other SAS Institute Inc. product or service names are registered trademarks or trademarks of SAS Institute Inc., Cary, NC, USA.

The descriptive statistics and correlations of all the variables included in the research model are included in Table 2.

Table 2. Means, standard deviations, and Pearson correlations of the variables

Table 2. Means, standard deviations, and Pearson correlations of the variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Public speaking anxiety (T1)	155.67	38.22		-.133*	-.511*	-.100*	.072*	-.020	-.066	.719*	-.354*	.103*
2. Communication mindset	5.59	.89			.398*	.206*	.220*	.247*	.205*	-.157*	.293*	.025
3. Communication efficacy (T1)	5.15	1.06				.255*	.144*	.185*	.184*	-.435*	.521*	-.01
4. Agentic engagement	5.02	1.16					.760*	.768*	.767*	-.150*	.512*	.178*
5. Behavioral engagement	5.46	1.11						.753*	.731*	.004	.435*	.218*
6. Cognitive engagement	5.23	1.14							.718*	-.070*	.472*	.142*
7. Emotional engagement	5.04	1.34								-.155*	.438*	.145*
8. Public speaking anxiety (T2)	144.45	38.44									-.410*	.011
9. Communication efficacy (T2)	5.33	1.08										.070*
10. Grade	851.08	101.57										

*indicates significance at the $p > .01$ level

Structural Equation Model

Following the two-step approach to structural equation modeling, a measurement model was first tested. For public speaking anxiety, the 34 items of the PRPSA were randomly parceled to create three indicators. Both communication mindset as well as communication efficacy were parceled to create two indicators. The four types of engagement (agentic engagement, behavioral engagement, cognitive engagement, and emotional engagement) were used as separate latent constructs, using their 4-5 corresponding items from Reeve's (2013) scale as indicators.

To assess model fit, the χ^2 statistic was used along with other subjective indices. The original measurement model showed good model-data fit. To indicate a good model fit, Hu and Bentler (1999) and Brown and Cudeck (1993) recommend a standardized root-mean-square residual (SRMR) close to .08 or less, a root-mean-square-error of approximation (RMSEA) close to .06 or less, and comparative fit index (CFI) greater than .95. For the measurement model, the $\chi^2 (1733) = 6529.71$ was significant ($p < .001$) likely due to large sample size, but SRMR = .05, RMSEA = .052 [90% CI = .049-.053], and CFI = .92. The SRMR and RMSEA values exceeded the minimum requirements for model fit. The CFI was slightly low, but still within range of a reasonably good fit (.90 or above, Brown & Cudeck, 1993). All loadings were significant at the $p < .001$ level and ranged from .68-.96.

Since an acceptable measurement model was confirmed, a structural equation model could be tested. The model consisted of three exogenous variables: public speaking anxiety, communication efficacy, and communication mindset, all measured at

time one. Additionally, the model included seven endogenous variables, six of which were latent constructs. Four of the latent constructs (the four types of engagement) were tested as mediators and allowed to correlate. The remaining two latent endogenous variables were public speaking anxiety and communication efficacy measured at time two. For each of these, a path was included in the model from their respective time one measurements. Finally, one observed variable (student grade) was included in the model.

The structural equation model, along with path coefficients, is pictured in Figure 6 and showed excellent model fit. The $\chi^2(709) = 2564.26$ was significant ($p < .001$) likely due to large sample size, but SRMR = .05, RMSEA = .05 [90% CI = .049-.053], and CFI = .95. In the model, the paths from communication efficacy and communication mindset to all four engagement types were significant, but public speaking anxiety only predicted behavioral and cognitive engagement. For behavioral engagement, public speaking anxiety was the strongest predictor, but for agentic engagement, cognitive engagement, and emotional engagement, communication mindset was the strongest predictor. The three exogenous variables accounted for 8% of the variance in agentic engagement, 12% of the variance in behavioral engagement, and 11% of the variance in both cognitive and emotional engagement.

Only .01% of variance in course grade was predicted by the four types of student engagement, with behavioral engagement being the strongest predictor. However, 59% of the change in communication efficacy was explained by the model, and 53% of the change in public speaking anxiety was explained. Excluding their time one counterparts,

the strongest predictor of communication efficacy was agentic engagement and the strongest predictor of public speaking anxiety was behavioral engagement.

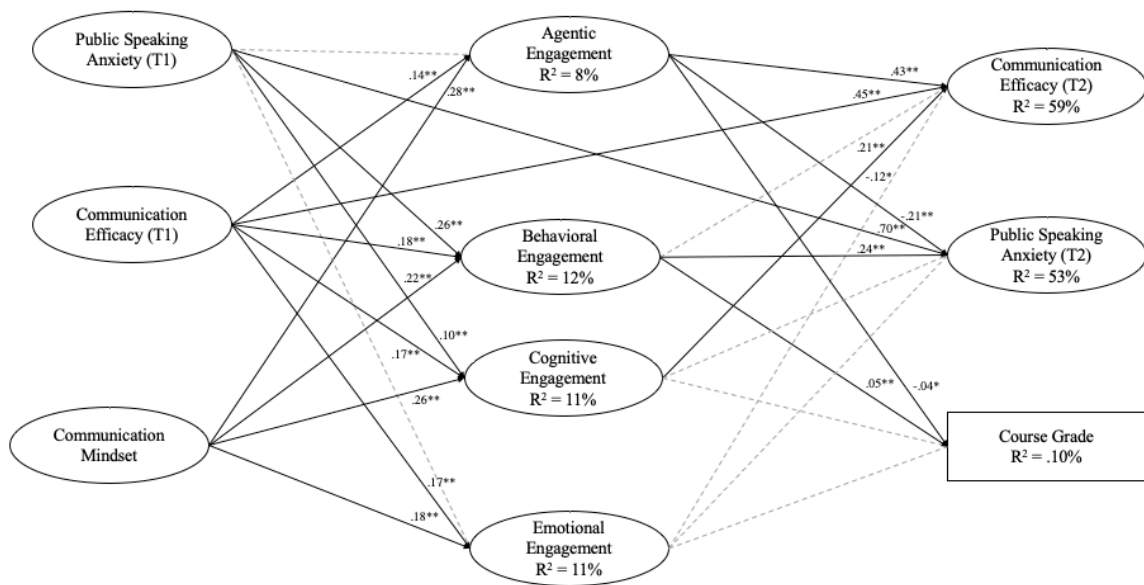


Figure 6. Results of the Introductory Course Learning Model

Discussion

This study provided important insights on the impact of students' cognitions when entering the introductory course, the mediating role of student engagement, and learning outcomes of the course.

The primary finding of the study is that it provides evidence to explain how exactly public speaking and communication efficacy are improved during the introductory course. Over 50% of the variance in these two variables could be explained by the model. While previous research has shown the introductory communication course successfully increases communication self-efficacy and decreases public speaking anxiety, little research has exposed the underlying mechanisms for this shift. This fitting model points to the idea that although students may enter the introductory course with varying levels of mindset, self-efficacy, and PSA, it is the way which they interact with the course throughout the semester that plays a critical role in how much they grow.

Next, the study provided some interesting insights on the way the different types of engagement uniquely impact the changes in communication efficacy and public speaking anxiety during the introductory course. Agentic engagement explained 43% of the change in communication efficacy students experienced. Similarly, agentic engagement had a significant and negative predictive power of public speaking anxiety, indicating students who reported more agentic engagement experienced more reduction in public speaking anxiety during the course. What is specifically interesting about this finding is that the items that make up agentic engagement, such as “I let my teacher know what I need and want” involve communication. So, it is difficult to determine if the result of a student communicating more with the professor is what increased self-efficacy and reduce PSA, or if it was the simple act of communicating itself that allowed students to “practice” those skills, and the reduction came from that practice.

Behavioral engagement did not predict communication efficacy, but cognitive engagement did. As cognitive engagement increased, so did communication efficacy. Since communication self-efficacy is really focused on a students' perception of their ability to communicate well in a variety of situations, it makes quite a bit of sense that the act of thinking deeply about course material and applying that knowledge outside of the course would lead to this increase. However, the opposite was true for public speaking anxiety. Cognitive engagement did not predict PSA, and behavioral engagement actually predicted an increase in PSA – a puzzling finding. The path between public speaking anxiety and behavioral engagement at time one was also significant. Essentially, heightened PSA caused students to engage more behaviorally in class, but those behaviors actually made the PSA worse. One potential explanation is that behavioral engagement within the introductory course might involve more practice and an increase in public speaking behaviors, therefore students simply experienced more anxiety during the course. There also could be a recency effect occurring, in that the students who reported more frequent behavioral engagement in the course might have been practicing more at the end of the course (closer to the time two measurement) to do well on their final speech assignments. This explanation is consistent with previous research that shows when students view the public speaking situation as very important or high stakes, anxiety is typically higher (Keaten & Kelly, 2004).

The findings on emotional engagement are quite unique. Emotional engagement was the only engagement type which did not meaningfully predict any change in communication efficacy, public speaking anxiety, or grade during the course. Because

engagement was measured through self-report at the end of the course, it is possible that students' end of semester stress could be masking a connection between emotional engagement and outcomes.

Next, this study provided support for the critical role that communication mindset plays in shaping the ways students engage in the course. Communication mindset predicted variances in all four types of engagement and was the strongest predictor of variance in three of the four types. In particular, communication mindset has a strong impact on agentic engagement, which played the strongest role in improving communication efficacy of the engagement types and also was the only engagement type to facilitate a reduction in public speaking anxiety.

Public speaking anxiety only predicted behavioral and cognitive engagement. This is interesting for a number of reasons. For one, previous research in the introductory course has heavily emphasized the role public speaking anxiety plays within the course. However, the results of this study support previous work (Nordin & Broeckelman-Post, 2019) indicating that a students' mindset towards communication and communication efficacy are more important in shaping engagement. One potential explanation for the break in support between this study and some of the previous literature is that the sample used for this study was from a hybrid-style introductory course, whereas some previous studies used a course primarily focused on public speaking anxiety (Hunter et al., 2014; Strawser et al., 2017). It is logical that with less emphasis on public speaking skills, public speaking anxiety may be less relevant for students.

There are several limitations of this study that should be discussed. First, although all instructors teaching the introductory course went through a standardized training process, this research did not control for any instructor effects on engagement or outcomes. Since research has shown that teachers' own mindset and the type of feedback given in the classroom can both impact students' mindsets, this is an important area for future research. Future studies should attempt to measure messages from instructors to determine whether those messages influence the relationships between the ways students are thinking about communication at the beginning of the course, their engagement, and course outcomes.

Conclusion

In conclusion, this study made important contributes to understanding the ways students engage with, progress through, and benefit from the introductory course. The next chapter will discuss the findings of each study in context with each other and offer insight on the overall implications of the dissertation as a whole.

CH. 6: DISCUSSION AND IMPLICATIONS

This dissertation described the process of creating an evidence-based communication mindset intervention and confirming the critical role of mindset in engagement and outcomes of the introductory course. The following chapter will summarize the main implications of the findings in context with each other, offer insight on how the findings contribute to existing bodies of theory, and finally, discuss practical implications along with limitations of the research.

Findings

The most exciting finding of this research was the success of the communication mindset intervention which was developed. There was not an overall difference between intervention conditions over time within the pilot study, but there was a significant difference between the activity-based intervention and the control group. In the larger intervention test, there was a significant interaction between time and intervention condition and follow up analysis showed the video-based intervention and the activity-based intervention successfully increased communication mindset more than the other conditions.

There are few potential reasons for the difference in results between these two studies. First, it is possible that the sample size was simply higher, and it was therefore more possible to detect the effect of the intervention. Second, it is possible the difference in sample impacted the results. The sample within the pilot study was drawn from Amazon's Mechanical Turk, and although participants had to confirm that they were

indeed college students, they did not necessarily have to be enrolled in an introductory course. The sample within the main intervention test were college students currently enrolled in the course, so it is possible the intervention was simply more salient because of that context.

In addition, the actor in the video intervention was practicing a version of an explanatory speech that was based on the one that the participants were also required to do as part of the introductory course. In this way, the video intervention was specifically tailored to the participants of the second study. Tailoring is frequently used to increase the impact of interventions, so the tailored nature of the video is one potential reason that intervention was so powerful for those students.

There also could be an effect of identification with the actor in the video. The actor was a college student at the same school the study was conducted. Previous studies on modeling and self-efficacy have shown that similarity of a subject in a video to the individual watching the video generally increases the power of an intervention. When a participant sees a model that is similar to them increase their communication skills, it may feel more possible for them to also increase their communication skills. One study on videos used in the introductory course found that speech videos where the subject was in plain clothes, versus videos where the subject was wearing a suit, were more successful in increasing students' feelings of relatedness and self-efficacy.

In general, the success of the video condition particularly points to several areas of future research that can be studied. The intervention should be replicated again using participants from another university to further support the success of the intervention, and

to answer questions about how large of an impact was made by the tailoring of the video. Additionally, future research should test video interventions with different subjects modeling the improvement. Since there are demographic differences in students' communication mindset scores, including diverse models in these studies and testing for the impact of subject-participant similarity will be critical in these future pieces of research.

Another important finding related to the video intervention was that the impact held through the end of the semester. During the gap between intervention and post-course survey, it is possible that student engagement played a role in the students' higher levels of self-efficacy at the end of the course. Findings from the structural equation modeling study indicate students with more of a growth mindset tend to engage more in the course in all four domains (agentic, behavioral, cognitive, and emotional). The agentic engagement is particularly important, as it was predictive of both an increase in self-efficacy at the end of the course and a reduction in public speaking anxiety. Essentially, these studies in context with each other point to the conclusion that the intervention effects lasted not simply because the intervention itself was powerful enough, but also because the increased mindset as a result of the intervention could have changed engagement patterns throughout the semester, therefore producing the positive results at the end of the course.

It is also important to note that the previous modeling research found mindset was the most powerful predictor of cognitive engagement, which in turn, predicted communication self-efficacy at the end of the course. As communication self-efficacy is

one of the critical learning outcomes of the introductory course, this finding (in combination with the result of the intervention itself increasing self-efficacy) make a compelling argument for the effectiveness of mindset interventions as a useful tool in producing desired introductory course outcomes.

Implications for Theory

First, this research supports Dweck's original assertion that mindset is relevant and powerful in the social domain (Dweck & Leggett, 1988). A large portion of the growth mindset research that has occurred within academia has focused on more generalized mindset towards intelligence (Scott & Ghinea, 2014), or towards skills emphasized in early education like math (Good et al., 2003; Huang et al., 2019; Karumbaiah et al., 2017; Snyder, 1999). With universities recognizing communication skills as critical to success both within college (Horton, 2015; McKenna-Buchanan et al., 2020; Sidelinger & Frisby, 2019) and beyond (Ehlers & Kellermann, 2019; Levy & Cannon, 2016), this research opens up a large area of future study as to how students communication mindset could be impacting their overall experience in college. Moreover, communication skills are important in any classroom, so although this research focused specifically on the introductory course, it is possible that communication mindset is make an impact in other courses as well. In particular, studies that seek to investigate engagement in a variety of college classroom settings should consider communication mindset as an important potential predictor of that engagement.

Second, this research supports emerging scholars who posit that mindset might be individual-specific. In the original mindset measures, the malleability of intelligence was proposed and written as a global phenomenon. Dweck's early research focused on whether or not intelligence could improve overall, and questions were phrased in a general way (i.e. "You can improve your intelligence). Recently, however, scholars have challenged the idea that believing it is possible to improve intelligence is the same as a student's belief that they can improve *their own* intelligence. In a comparison of two scales, one which presented a generalized view of intelligence, and one which presented an individual specific view (i.e. "I can change my intelligence), the individual specific scale explained more variance in achievement goals, helplessness attributions, as well as grades, engagement, and truancy (De Castella & Byrne, 2015). This subtle, but meaningful difference could explain why the activity condition was effective in both the pilot and main intervention test. In the pilot test, students who endorsed a growth mindset frequently cited examples of times they themselves had increased their communication skills. Similarly, the activity intervention asked students to describe a time they had increased their own communication abilities. Especially with the context of students' beliefs in the subjectivity of communication, testing a generalized versus individualized perception of communication mindset specifically is an important step for future researchers.

Third, this research raises questions about the domain-specificity of mindset. The students' qualitative responses from the pilot development interviews pointed to the idea that communication skills have unique qualities that make them different than math or

reading ability. Since math and reading are subjects where mindset is frequently studied, an interesting starting point for future would be to compare students' mindset towards these three domains. Further, domain-specific research on mindset towards math indicates that women and girls typically have more of a fixed mindset, and men have more of a growth mindset. A frequently used explanation for this phenomenon is stereotypical notions of women being "bad at math," which theoretically influences female students' belief that they can improve in that area. In the opposite way, the previous Nordin and Broeckelman-Post (2020) research study found communication mindset is actually higher in women than in men, and the researchers posit this may also be due to stereotypes surrounding the communication abilities of men versus women (Campbell, 1989; Jamieson, 1995). In interviews, several participants mentioned the emotional intelligence required to be good at communication, and emotional intelligence is a characteristic typically attributed to women more than men (Lopez-Zafra & Gartzia, 2014). Essentially, the success of this intervention and research in context supports further research on the role of domain-specificity in mindsets, and the role that stereotypes and mental models from those domains might play in predicting mindset levels across demographics.

Fourth, this research provides support for the design-based approach to research suggested by (Kaplan et al., 2011). The success of the video intervention, which was highly tailored based on the results of interviews with actual introductory course students, supports the assertion that more attention to the input side of interventions might improve their efficacy in producing the results theory says they should (Nastasi & Schensul,

2005). Alongside a design-based approach, a mental models approach was a useful tool in the development of the successful communication mindset intervention. Previous research has asserted that mental models are a useful tool in helping researchers examine the way people understand a specific domain of knowledge (Greca & Moreira, 2000). The sub-field of the communication discipline as a whole that uses mental models the most frequently is science communication. However, this research supports mental models as a tool for future scholars of communication education, particularly because it helps create an understanding of how students conceptualize communication skills and the way they change and improve.

Finally, this research offers an interesting perspective on cultivating agentic engagement in the classroom. Growth mindset significantly predicted agentic engagement, which is interesting for a number of reasons. Mainly, previous research on agentic engagement has contended that there is no direct way for instructors to encourage agentic engagement among students, and that it instead must be cultivated through a combination of complex and skill-involved teacher behaviors (Reeve, 2013). With a large amount of introductory course classes taught by graduate students, not all instructors of the introductory course may have the kind of skills needed right away to facilitate agentic engagement. But, if a communication mindset can encourage agentic engagement starting from the student, and if an intervention can successfully increase communication mindset, then it is possible to boost the amount of agentic engagement outside of specific teacher training.

Implications for Practice

Beyond theoretical implications, this dissertation makes several valuable contributions and suggestions for practice. Primarily, the work of this dissertation can be collectively used to advocate for the use of communication mindset interventions as a part of the introductory course curriculum. The intervention materials within this dissertation can and should be used as a basis for future interventions, and the various formats can be combined for a (potentially) more effective tool. A key portion of any mindset intervention is providing evidence that communication skills can be improved, so the results of this dissertation can also be used as evidence of that possibility for growth within future intervention designs. As previously mentioned, researchers and instructors should work alongside students to adapt the intervention materials from this dissertation to the content, curriculum, and needs of a specific student population. The benefit of the series of studies that were included in this dissertation is that they can be easily replicated and used to create interventions that are tailored and unique.

Even further, the centralized message that contributed to the success of the intervention (“communication skills can be grown and improved, like building a muscle”) can and should be integrated as part of the messaging students’ receive when they register for and begin the introductory communication course. Not only is this intervention relatively cheap to produce and tailor, but it was effective in a completely online format. In the age of COVID where many universities are operating completely online, the intervention can still be a useful tool for student success.

Second, findings from the video intervention specifically offer insight on potential changes to the way videos are used within introductory course. Many introductory courses provide examples of speeches for students to use. Those speeches are often high quality speeches or even nationally ranked-performers, but some programs do provide lower quality speeches as examples as well. However, to the researcher's knowledge, not many introductory courses are providing video evidence that a student can improve. Instead of providing simply the end result video of a speech, an easy shift that can be immediately put into practice (without developing a whole intervention) would be to offer two different version of a speech – one practice speech that may be a little bit worse, and one final version where improvement is clearly visible. Obviously, this is something that future research should investigate and test, but the clear efficacy of the video intervention from this dissertation points to videos as, at the very least, an interesting suggestion for a place where growth mindset could be potentially increased by course material.

Next, the results of this dissertation (and in particular, the modeling portion) point to the need to emphasize agentic engagement within the introductory course. Agentic engagement predicted both an increase in communication self-efficacy and a decrease in public speaking anxiety. Although increasing students' mindset (which predicts agentic engagement) is a good start, there are other ways to increase agentic engagement. Reeve (2013) suggests that autonomy supportive teaching is highly skilled teaching, so increased instructor training is one suggestion for improvement. That teacher training

should emphasize an autonomy-supportive classroom motivating style, which involves being more responsive to students' interest, goals, and suggestions (Reeve, 2013).

Finally, this dissertation in combination with previous research could be used to build a program that targets students cognitions about communication (such as mindset, efficacy, public speaking anxiety, etc) and directs them to appropriate resources. In both the pilot and main intervention study, the group that had the lowest growth mindset was most affected by the intervention. There are empirically supported ways to decrease PSA (such as visualization or exposure), increase communication mindset (such as an intervention), and increase self-efficacy or communication competence (such as practice), and there are ways to measure students' levels of these constructs at the beginning of the course. Thus, it could be possible (and extremely beneficial) to direct students to the types of resources that may help them most. Students who struggle with communication mindset could be directed to a quick intervention, students who struggle with PSA could be directed to resources for extra exposure and practice, etc, etc. An increasing number of universities are using communication centers to assist the introductory course, and these are a potential area where interventions, programs, and therapies could be located and accessible to students. In this approach, instead of trying to build a bulletproof basic course that changes a students' cognition surrounding communication in a myriad of ways, the course could be effectively (slightly) personalized for each student.

Limitations and Future Directions

There are several limitations of this study which should be addressed. First, the entire manuscript at hand is centered around increasing communication mindset in the context of the introductory course. Although this is undoubtedly a great starting point, communication skills are necessary in every area of life. Other types of mindset interventions have been studied across a wider variety of populations. With the exception of the pilot data, all the participants in these series of studies were from the same course, within the same university. The first step in future research will need to be replication in order to test both the efficacy of the intervention that was created within other contexts, and replication to see if the entire intervention creation process can be successfully replicated at another university or with another population.

Another notable limitation is the timing of this intervention. Data was gathered in the fall of 2019, and in February of 2020, the COVID-19 pandemic hit universities across the nation and world. As universities shift to online education and the workplace shifts into a virtual world, the possible long-term impacts of these shifts remain unknown. The way communication skills may change, and the way introductory courses are able to encourage and grow those communication skills, may shift in an online environment.

A third limitation that is worth noting again is the small number of participants involved in the initial interviews. Because the study was designed as a pilot, only 11 participants were used to gather data on mental models surrounding communication skills. More depth would have undoubtedly been achieved with more participants, and

future research should replicate that portion of the dissertation as a full, independent piece of research.

Finally, a major limitation of this research is that it did not address the role of teachers or previous experience in developing communication mindset. Although more is understood now about the role communication mindset plays in the introductory course, as well as how to change communication mindset, much still needs to be understood about the origins and antecedents of communication mindset. Future research should investigate the role of instructor and potentially parental messages about communication skills on mindset, the role of previous experience, and attempt to understand how all of these factors impact related variables like public speaking anxiety and communication self-efficacy as well.

Conclusion

This dissertation aimed to conduct formative research, develop, and test a communication mindset intervention. The pilot test showed signs of tentative success, and in the main intervention test, two of the three intervention conditions successfully increased communication mindset. The final chapter focused on the role of communication mindset as a predictor of engagement, and in turn meaningful learning outcomes of the introductory course. Not only do these findings contribute to existing theory in a diverse array of fields, including educational psychology, communication education, and instructional communication – it also has tangible, real-world use and can be translated into practice immediately. In short, communication mindset matters, and it

can be changed. Students across the nation who are apprehensive, nervous, or intimidated about the introductory course, or communication as a whole can simply remember. It is possible to get better. As this dissertation has articulated - growth mindset can be grown.

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BIOGRAPHY

Karin Nordin is a certified nutrition coach, freelance curriculum writer, and growth mindset superfan.