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Research Article

Growth Mindset: Associations with Apprehension, Self-Perceived Competence, and Beliefs about Public Speaking

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Abstract

The relationships among growth mindset for public speaking (i.e., the implicit theory that public speaking abilities can be developed and improved) and beliefs about the nature of public speaking, public speaking apprehension (PSA), and self-perceived public speaking competence (SPPSC) were investigated in intensive and traditional formats of a general education public speaking course. In general, growth mindset was associated with lower PSA, higher SPPSC, and more sophisticated beliefs about public speaking. Mindset remained somewhat stable, PSA significantly decreased, and SPPSC significantly increased from the beginning to the end of the course. More sophisticated beliefs about public speaking as an expressive, transformational, and audience-centric endeavor also tended to increase. However, there were several important differences between intensive and traditional formats. In particular, changes in the intensive format were more consistent across variables and had larger effect sizes.

Keywords: public speaking; mindset; beliefs; apprehension; instruction

Poignant and memorable speeches, delivered with eloquence and style, have the power to inspire and inform countless listeners. Given people's respect and sometimes awe for impressive speakers, a natural question is how they came by such skill—are good public speakers born or made? A common misconception for complex cognitive and communicative processes is that they require innate talent or abilities that are outside of our control. In truth, these skills can be developed, trained, or improved (Ericsson, 2014), yet the *belief* that they are unchangeable persists. Carol Dweck and colleagues (Dweck, 2006; Yeager & Dweck, 2012) have conceptualized a continuum of such beliefs in terms of fixed and growth *mindsets* that can have a profound impact on the way students perceive and acquire new skills. Individuals with more of a *fixed mindset* view personal abilities as largely unchangeable or innate traits or aptitudes, whereas people with more of a *growth mindset* perceive abilities as skills or competencies that can be developed through effort and practice.

In challenging learning environments, such as a university-level public speaking course, a fixed mindset may contribute to apprehension and disengagement. Many students experience profound anxiety or fear related to public speaking (Bodie, 2010; McCroskey, 1977b) that can have negative immediate consequences (e.g., reduced participation and performance in college courses; McCroskey, 1977a; Rocca, 2010) and long-term consequences (e.g., leadership, and adaptability; Blume, Baldwin, & Ryan, 2013). If students believe their public speaking abilities are weak and unchangeable, they might be particularly prone to responding to public speaking assignments with high anxiety. These students will anticipate that public speaking assignments will likely result in failure and embarrassment. In addition, a fixed mindset may lead students to resist or avoid opportunities for practice and learning. In contrast, a *growth mindset* may predict lower anxiety, higher confidence, and increased effort and persistence. When students believe that their public speaking abilities can be improved and honed, they may be more resilient in the face of failure and welcoming of instruction and feedback. Public speaking errors and missteps may still be embarrassing, but not *permanently* so.

It is important to note that these mindsets are conceptually orthogonal to self-efficacy (e.g., Bandura, 1993). Students with lower self-efficacy may hold and benefit from a growth mindset ("if I work on my speeches, I can get better") while those with higher self-efficacy may hold and be hindered by a fixed mindset ("no need to work hard on this speech" or "I guess I'm not as good at public speaking as I thought"). Indeed, interventions designed to inspire growth mindsets have improved academic outcomes across grade levels and domains, including higher education

(Paunesku et al., 2015), and are now being broadly promoted by and to policy makers (Rattan, Savani, Chugh, & Dweck, 2015).

The purpose of the current studies is to explore college students' mindsets regarding public speaking and their relationship to apprehension, self-perceived competence, and other beliefs about public speaking. Although a few prior studies have investigated mindsets in another context for verbal communication instruction (i.e., writing; Limpo & Alves, 2014; Mateos et al., 2011), only one previous study applied this concept to public speaking instruction (Stewart, McConnell, Stallings, & Roscoe, 2017). The current studies extend this research by measuring changes in mindset and other beliefs about public speaking from the beginning to the end of a general education public speaking course in both intensive and traditional formats. Thus, we are able to investigate not only relationships among these variables but also the extent to which (a) mindset and beliefs about public speaking change as a result of the course, (b) initial mindset and beliefs about public speaking predict end-of-the-semester public speaking apprehension and self-perceived public speaking competence, and (c) compare results between traditional and intensive formats.

A wealth of prior research has explored various methods for ameliorating or treating public speaking and communication apprehension among students (Allen, Hunter, & Donohue, 1989; Bodie, 2010; Hunter, Westwick, & Haleta, 2014; Robinson, 1997), including basic instruction, desensitization, creating a supportive climate, and more. If mindset and other public speaking beliefs explored in the current studies indeed predict end-of-semester outcomes, these results would suggest actionable ways to broadly improve public speaking apprehension interventions via incorporating mindset-related instruction.

Literature Review

Mindsets and Beliefs about Public Speaking

Mindsets are implicit theories about personal attributes that guide individuals in "making predictions and judging the meaning of events in one's world" (Yeager & Dweck, 2012, p. 303). Individuals with more of a fixed mindset perceive personal attributes as largely unchangeable, whereas those with more of a growth mindset describe attributes as "things you can cultivate through your efforts" (Dweck, 2006, p. 7). Dweck and colleagues initially focused on mindsets for intelligence, but subsequent research has expanded the applications. Within a "multiple intelligences" framework, people perceived verbal intelligence as the most changeable, whereas creative and musical intelligences were rated as the least changeable (Furnham, 2014).

Therefore, students may be predisposed to endorse a growth mindset for the verbal skills of public speaking. Growth mindset may also enhance learning verbal skills (Limpo & Alves, 2014). It should also be noted that growth and fixed mindsets are not truly dichotomous but are "widely examined along a single continuous dimension with [fixed] beliefs at one end and [growth] beliefs at the other" (De Castella & Byrne, 2014, p. 254).

Importantly, students not only have implicit theories about public speaking skills but also hold a variety of beliefs about the nature and purpose of public speaking. Drawing upon research on writing, researchers can infer several potential beliefs: transmission, transaction, recursive process, and audience orientation (Sanders-Reio, Alexander, Reio, & Newman, 2014; White & Bruning, 2005). *Transmission* beliefs conceptualize public speaking as a means of sharing others' knowledge, primarily from expert and authoritative sources. *Transaction* beliefs describe public speaking as a process that allows speakers to express and understand their own knowledge, feelings, and opinions. *Recursive process* beliefs define public speaking as an iterative process involving extensive revising and rehearsal. Finally, *audience orientation* beliefs emphasize the importance of addressing and adapting to the needs and expectations of the audience. Research on such beliefs in a writing context have found that transmission beliefs tend to be correlated with lower quality writing and lower writing self-efficacy (Sanders-Reio et al., 2014; White & Bruning, 2005). In contrast, transaction, recursive process, and audience orientation beliefs tend to correlate positively with writing proficiency and self-efficacy (Sanders-Reio et al., 2014). With regard to mindsets, fixed mindsets have been found to be negatively associated with transaction beliefs that writing involves strong affective and cognitive engagement (Mateos et al., 2011).

Stewart et al. (2017) demonstrated that students hold similar beliefs about public speaking, and these beliefs are related to mindset. Students who endorse more of a growth public speaking mindset showed lower endorsement of transmission beliefs and higher endorsement of transaction beliefs. Similarly, students who endorsed more of a growth mindset also showed higher endorsement of recursive process and audience orientation beliefs. Direct instruction and first-hand experience with public speaking may support belief formation and/or revision (Wyer & Albarracín, 2014). Students may develop a growth mindset as they improve their public speaking through practice or develop stronger or more sophisticated beliefs about public speaking as they learn more about it.

Based on this prior research, we pose the following hypotheses regarding mindset and beliefs about public speaking.

> **H1**: Students who express higher growth mindset will demonstrate: (a) lower transmission beliefs, (b) higher transaction beliefs, (c) higher recursive process beliefs, and (d) higher audience orientation beliefs.

> **H2**: Overall, students will (a) express higher growth mindset and (b) higher transmission, transaction, recursive process, and audience orientation beliefs at the end of the semester than at the start of the semester.

Mindset, Beliefs, and Public Speaking Outcomes

Two important goals for public speaking courses are to reduce public speaking apprehension (PSA) and to increase self-perceived public speaking competence (SPPSC) (e.g., Hunter et al., 2014). PSA is an aspect of communication apprehension, which is "an individual's level of fear or anxiety associated with either real or anticipated communication with another person or persons" (McCroskey, 1977b, p. 78). SPPSC is "speakers' perceptions of their expertise in public speaking" (Ellis, 1995, p. 64). Decreasing communication apprehension is an important educational outcome because it may improve college student participation, performance, retention, and completion (McCroskey, Booth-Butterfield, & Payne, 1989). Similarly, students' perceptions of their own communication competence may influence their perceptions of the quality of instruction in communication as well as their motivation to pursue courses or majors that require a great deal of communication (McCroskey & McCroskey, 1988). Numerous studies have documented that public speaking courses decrease apprehension and increase self-perceived competence (e.g., Ashlock, Brantley, & Taylor, 2015; Broeckelman-Post & Pyle, 2017; Dwyer & Fus, 2002; Ellis, 1995; Hunter et al., 2014; Rubin, Rubin, & Jordan, 1997; Suwinvattichaiporn & Broeckelman-Post, 2016). We therefore pose the following hypothesis (replicating previous findings from different institutional contexts):

> **H3**: Overall, students will demonstrate (a) less PSA and (b) higher SPPSC at the end of the semester than at the start.

A link between mindsets, PSA, and SPPSC is suggested by research on college students' beliefs about writing as a "gift" (i.e., fixed mindset) or a "learnable" ability (i.e., growth mindset). Students with a fixed mindset toward writing reported higher writing apprehension (Palmquist & Young, 1992) and more negative assessments of their own writing (Charney, Newman, & Palmquist, 1995; Palmquist & Young, 1992). In the public speaking context, students who more strongly endorsed a growth mindset showed lower PSA and higher SPPSC (Stewart et al., 2017). We therefore propose the following hypothesis:

> **H4**: Students who express higher growth mindset will demonstrate (a) lower PSA and (b) higher SPPSC for public speaking.

Mindset interventions are designed to "target students' core beliefs about school and learning…" in order to "change how students interpret and respond to challenges in school, increase students' resilience, and set in motion positive recursive cycles that increase success over time" (Paunesku et al., 2015, p. 785). Because previous research suggests that mindset and beliefs about public speaking are related to PSA and SPPSC, it makes sense to consider whether initial mindsets and beliefs are associated with better outcomes at the end of the semester (cf. Haimovitz, Wormington, & Corpus, 2011; McCutchen, Jones, Carbonneau, & Mueller, 2016). If so, these results would indicate that these beliefs are viable targets for similar interventions to improve outcomes in PSA and SPPSC. We therefore pose the following research questions:

> **RQ1**: To what extent are beginning-of-the-semester growth mindset and beliefs about public speaking predictive of end-of-semester (a) PSA and (b) SPPSC?

> **RQ2**: To what extent are beginning-of-the-semester growth mindset and beliefs about public speaking predictive of change in (a) PSA and (b) SPPSC?

Intensive versus Traditional Courses

Another important factor in understanding students' mindsets, beliefs, or attitudes about public speaking may be the structure of the course. Intensive courses

are offered in a more condensed time period (e.g., 3-7 weeks) than traditional semesters, with the most familiar format being summer courses (Daniel, 2000; Wlodkowski, 2003). Intensive courses are becoming more common as universities and colleges attempt to serve more non-traditional students. Daniel (2000) concluded that intensive courses typically have similar, and sometimes better, outcomes in student learning than traditional courses, despite differences in how intensive and traditional courses are taught and assessed, perceived by students and faculty, and in the population of students who enroll in each type of course. Nationally, students enrolled in summer courses are more likely to be lower income, working full-time, commuting to campus, and older compared to students enrolled in traditional courses (Smith & Read, 2013).

Several studies suggest that intensive courses actually lead to better student learning outcomes than traditional courses (Austin & Gustafson, 2006; Sheldon & Durdella, 2010). In the public speaking context, a recent study compared intensive and traditional public speaking courses and found that students enrolled in intensive courses may be somewhat higher in apprehension, but that both intensive and traditional formats were effective in reducing PSA (Ashlock et al., 2015).

Students also perceive intensive courses to be qualitatively different than traditional courses, leading to more active learning, higher motivation, and closer relationships and greater obligation to classmates (Lee & Horsfall, 2010; Scott, 2003). Students' ratings of courses are also higher for intensive compared to traditional courses (Kucsera & Zimmaro, 2010). Faculty who teach intensive courses report that they devote more time to planning and varying class activities than they do in traditional courses, due to the shorter amount of time between classes and the longer duration of each session (Hyun, Kretovics, & Crowe, 2006). Faculty also report using different teaching methods, assignments, and assessments in intensive courses compared to traditional courses (Kretovics, Crowe, & Hyun, 2005).

Because we ran two studies, the first during the summer with intensive, 3- or 5-week formats, the second during a traditional, 15-week fall semester, we are able to compare the results between these two studies in order to answer the following research question:

> **RQ3:** To what extent are traditional and intensive courses similar or different with respect to the hypotheses and research questions posed above?

Study 1

Method

Participants and Context

Participants were enrolled in a required general education public speaking course at a large, urban public university in the southeastern United States. The course comprised multiple sections and instructors but used a standard textbook and sequence of speech assignments. These students were enrolled in an intensive (3 or 5-week) format taught in a summer session.

The sample comprised 152 students (66.4% female; M_{age} = 22.24, SD = 4.94), and most identified as White (53.9%) or Black/African-American (24.3%) and reported English as their first/native language (90.1%). The sample included first-years (13%), sophomores (33%), juniors (28%), and seniors (26%). Of this sample, 115 completed both the pre- and post-survey. Based on institution-wide data, 91.1% of summer students were part-time.

Procedures

Paper-and-pencil pre- and post-surveys were administered in class at the beginning and end of the semester. In Study 1, the pre-survey was administered on the first day of class and the post-survey on the last day of class. Data from the pre- and post-surveys were matched at the individual student level using ID numbers. Missing data were excluded pairwise for correlational analyses, and list-wise for all other analyses.

Measures

In addition to basic demographic questions, participants responded to a series of statements about public speaking beliefs and attitudes using a Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) for *all* items. The specific measures adapted by Stewart et al. (2017) are described below.

Public Speaking Mindset. A four-item measure of public speaking mindset was adapted from Limpo and Alves (2014), who based their writing mindset items on work by Dweck (1999) and Hong, Chiu, Dweck, Lin, and Wan (1999). The wording of these items was revised to refer to public speaking (e.g., "My speeches will always be of the same quality, no matter how much I try to improve them"; pre-semester α = .76, post-semester α = .84).

Beliefs about Public Speaking. Measures of beliefs about public speaking were adapted from the Sanders-Reio et al. (2014) Beliefs about Writing Survey. The original items were revised to refer to public speaking and measured *transmission* (e.g., "The key to successful speaking is accurately summarizing what authorities think"; 2 items; pre-semester α = .61, post-semester α = .75), *transaction* (e.g., "making speeches helps me understand better what I'm thinking about"; 3 items; pre-semester α = .87, post-semester α = .87), *recursive process* (e.g., "A good speech requires intensive rehearsal to improve what has been prepared"; 4 items; pre-semester α = .83, post-semester α = .84), and *audience orientation* beliefs (e.g., "Good speakers adapt their message to their audience"; 7 items; pre-semester α = .76, post-semester α = .81).

Public Speaking Apprehension. Public speaking apprehension (PSA) was measured using 4 items from the public speaking subscale from the PRCA-24 (McCroskey, Beatty, Kearny, & Plax, 1985), capturing students' level of discomfort or fear during public speaking (e.g., "While giving a speech I get so nervous, I forget facts I really know"; pre-semester α = .84, post-semester α = .78).

Self-Perceived Public Speaking Competence. Self-perceived public speaking competence (SPPSC) was measured using 4 items from Ellis' (1995) Self-Perceived Public Speaking Competence Scale (e.g., "I use language that is extremely clear"; pre-semester α = .63, post-semester α = .52).

Results

H1: Relationships among Mindset and Beliefs

H1 predicted that higher growth mindset would be associated with lower transmission and higher transaction, recursive process, and audience orientation beliefs. At the beginning of the course, this hypothesis was confirmed for transmission (r = -.18) and higher transaction (r = .27) and audience orientation beliefs (r = .27). At the end of the course, the relationship between growth mindset and transmission beliefs was similar but no longer statistically significant (r = -.15), but positive associations between growth mindset and transaction (r = .27) and audience orientation (r = .35) beliefs remained significant, consistent with H1 (see Table 1).

Table 1

Correlations for All Measures on Pre-Semester Survey (Below the Diagonal) and Post-Semester Survey (Above the Diagonal)

	1.	2.	3.	4.	5.	6.	7.
1. Mindset	--	-.16	-.15	.27**	.01	.35**	.28**
2. Apprehension	-.35**	--	.06	-.22*	.08	.16	-.48**
3. Transmission	-.18*	.08	--	.21*	.32**	.06	-.17
4. Transaction	.27**	-.36**	.22*	--	.32**	.27**	.32**
5. Recursive	.04	.24**	.19*	.14	--	.37**	.05
6. Audience	.27**	-.01	-.08	.15*	.38**	--	.27**
7. Competence	.37**	-.50**	.06	.44**	.05	.11	--

Note. $^{*}p < .05$. $^{**}p < .01$.

H2 and H3: Changes in Mindset, Beliefs, and Attitudes

H2 predicted higher growth mindset, transmission, transaction, recursive process, and audience orientation beliefs, and H3 predicted lower PSA and higher SPPSC, at post-semester compared to pre-semester. A statistically significant repeated measures MANOVA was obtained, Wilks' $\lambda = .45$, $F(7,108) = 18.57$; $p < .001$, $\eta^2 = .55$. Endorsement of growth mindset, transmission, transaction, recursive process, and audience orientation beliefs increased from the beginning to the end of the semester, supporting H2 (see Table 2). The effect sizes ranged from moderate (for growth mindset, transmission, and recursive process) to large (for transaction and audience orientation; Cohen, 1988). In addition, PSA decreased and SPPSC increased, supporting H3. The effect size was moderate for PSA and large for SPPSC.

Table 2

Univariate RM-ANOVAs and Descriptive Statistics for All Measures

	RM-ANOVA					Pre-Semester		Post-Semester	
Measure	*MS*	*df*	$F_{(1,114)}$	*p*	η_p^2	*M*	*SD*	*M*	*SD*
Mindset	3.35	1	8.46	.004*	.07	3.87	0.82	4.12	0.85
Apprehension	9.10	1	21.96	<.001*	.16	3.84	0.98	3.45	0.91
Transmission	4.59	1	10.52	.002*	.08	2.66	0.85	2.94	1.04
Transaction	26.23	1	68.92	<.001*	.38	3.33	0.95	4.01	0.87
Recursive	2.88	1	11.81	.001*	.09	4.24	0.69	4.46	0.67
Audience	3.34	1	42.65	<.001*	.27	4.46	0.47	4.70	0.37
Competence	6.70	1	28.00	<.001*	.20	3.37	0.67	3.70	0.65

Note. $N = 115$. $*p < .007$, using the Bonferroni adjustment for protection of an experiment-wise error rate (α_e) of .05.

H4: Growth Mindset and PSA and SPPSC

H4 predicted that higher growth mindset would be associated with lower PSA and higher SPPSC. At the beginning of the course, students' growth mindset was significantly correlated with lower PSA ($r = -.35$) and higher SPPSC ($r = .37$), supporting H4 (see Table 1). At the end of the course, the relationship between growth mindset and PSA was smaller and no longer statistically significant ($r = -.16$). The association between growth mindset and SPPSC was also smaller but still statistically significant ($r = .28$).

RQ1 and RQ2: Predicting PSA and SPPSC

Multiple regressions were conducted to predict end-of-semester PSA and SPPSC and changes in these measures from beginning to end of semester. Beginning-of-semester mindset and the four beliefs about public speaking (transmission, transaction, recursive process, and audience orientation) constituted the predictor variables, whereas end-of-semester PSA and SPPSC, and change in PSA and SPPSC pre- to post-test (ΔPSA and ΔSPPSC) were the criterion variables (see Table 3).

Table 3

Relationships between Growth Mindset and Beliefs about Public Speaking on End-of-Semester Apprehension and Competence and Change in Apprehension

	Apprehension				Competence				Δ Apprehension			
Measure	*B*	*SE B*	*β*	sr^2	*B*	*SE B*	*β*	sr^2	*B*	*SE B*	*β*	sr^2
Mindset	-0.14	0.11	-0.12	0.01	0.09	0.08	0.12	0.012	0.15	0.11	0.14	0.01
Transmission	0.11	0.11	0.1	0.01	-0.11	0.07	-0.14	0.018	0.03	0.11	0.03	0
Transaction	-0.12	0.09	-0.13	0.01	0.11	0.07	0.17	0.025	0.2	0.09	.20*	0.04
Recursive	0.26	0.13	0.19	0.03	-0.03	0.09	-0.03	0.001	-0.2	0.13	-0.15	0.02
Audience	-0.29	0.2	-0.15	0.02	0.1	0.14	0.07	0.004	-0.3	0.2	-0.16	0.2
Constant	4.31	0.89			2.92	0.63			0.47	0.89		

Note. *p < .05.; sr^2 = squared part correlations, which indicate the unique variance predicted by the independent variable.

The linear combination of predictors for end of semester PSA was statistically significant, $F(5,109) = 2.72$, $p = .02$, $R^2 = .11$, adjusted $R^2 = .07$. However, none of the individual predictor variables had significant partial effects.

The linear combination of predictors for end of semester SPPSC was not statistically significant, $F(5,109) = 2.21$, $p = .06$, $R^2 = .09$, adjusted $R^2 = .05$.

The linear combination of predictors for ΔPSA was statistically significant, $F(5,109) = 2.76$, $p = .02$, $R^2 = .11$, adjusted $R^2 = .07$. Only transaction beliefs exhibited a significant partial effect on the change in apprehension ($B = 0.19$, $SE = 0.09$, $p < .05$)—students who endorsed stronger initial transaction beliefs experienced less of a decrease in apprehension.

The linear combination of predictors for ΔSPPSC was not statistically significant, $F(5,109) = 2.10$, $p = .07$, $R^2 = .09$, adjusted $R^2 = .05$.

Discussion

As hypothesized, growth mindset was associated with more sophisticated beliefs about public speaking (greater transaction and audience orientation beliefs, and lower transmission beliefs), consistent with prior research on growth mindset in both writing (Sanders-Reio et al., 2014; White & Bruning, 2005) and public speaking (Stewart et al., 2017). However, contrary to our hypotheses, growth mindset was not associated with recursive process beliefs, suggesting two possibilities. One is that students in the intensive format did not perceive preparation and rehearsal to be relevant to improving their public speaking skills. These students may have selected

an intensive format because they did not see the need for more time to work on their speeches. The other is that these students might otherwise value the rehearsal process, but the shortened course schedule discouraged them from making a link between rehearsal time and improving their skills.

The smaller associations between growth mindset and lower PSA and higher SPPSC at the end of the semester suggest that mindset became less relevant to these attitudes as the course progressed. Because of the shortened time period, they would have received more frequent external cues regarding their public speaking performance (feedback from peers or teachers, course grades, etc.), which may then be more important to their apprehension and self-perceived competence.

These results replicated prior findings that public speaking instruction both reduces PSA and increases SPPSC, and also demonstrated that public speaking instruction lead to stronger endorsements of other beliefs about public speaking. Students in this study most strongly endorsed recursive process and audience orientation beliefs and least strongly endorsed transmission beliefs. The strongest effect was an increase in transaction beliefs, suggesting that public speaking instruction helped to develop and reinforce the belief that public speaking is a cognitively engaging activity.

Finally, these results did not support the idea that initial mindset or beliefs about public speaking were strongly associated with outcomes in PSA or SPPSC.

Study 2

Method

Participants and Context

Participants were enrolled in a required general education public speaking course at a large, urban public university in the southeastern United States. The course comprised multiple sections and instructors but used a standard textbook and sequence of speech assignments. These students were enrolled in a traditional (15-week) format taught in the immediately subsequent fall semester to Study 1.

The sample comprised 718 students (59.5% female; M_{age} = 20.49, SD = 2.99), and most identified as White (50.0%) or Black/African-American (32.7%) and reported English as their first/native language (88.3%). The sample included first-year (10%), sophomores (42%), juniors (36%), and seniors (10%). Of this sample,

394 completed both the pre- and post-survey. Based on institution-wide data, only 27.7% the fall semester students were part-time.

Procedures

Paper-and-pencil pre- and post-surveys were administered in class at the beginning and end of the semester. The pre-survey was administered during the first week of the semester, and the post-survey during the last week of the semester. Data from the pre- and post-surveys were matched at the individual student level using ID numbers. Missing data were excluded pairwise for correlational analyses, and list-wise for all other analyses.

Measures

The measures were identical to those in Study 1: mindset (pre-semester α = .72, post-semester α = .79); transmission (pre-semester α = .68, post-semester α = .69); transaction (pre-semester α = .77, post-semester α = .77); recursive process (pre-semester α = .79, post-semester α = .82); audience orientation (pre-semester α = .74, post-semester α = .83); PSA (pre-semester α = .79, post-semester α = .73); and SPPSC (pre-semester α = .54, post-semester α = .59)

Results

H1: Relationships among Mindset and Beliefs

H1 predicted that higher growth mindset would be associated with lower transmission and higher transaction, recursive process, and audience orientation beliefs. At the beginning of the course, growth mindset was associated with lower transmission (r = -.20) and higher transaction (r = .26), recursive process (r = .15), and audience orientation (r = .30) beliefs. The same relationships were observed at the end of the semester, supporting H1. Growth mindset was associated with lower transmission (r = -.25) and higher transaction (r = .20), recursive process (r = .18), and audience orientation (r = .31) beliefs (see Table 4).

H2 and H3: Changes in Mindset, Beliefs, and Attitudes

H2 predicted higher growth mindset, transmission, transaction, recursive process, and audience orientation beliefs, and H3 predicted lower PSA and higher SPPSC, at post-semester compared to pre-semester. A statistically significant repeated measures MANOVA was obtained, Wilks' λ = .83, $F(7,387) = 11.27$; $p <$

.001, $\eta_p^2 = .17$. However, the univariate results only partially confirmed H2. Students demonstrated increased endorsement of transaction and audience orientation (with small to moderate effect sizes), but they did not demonstrate increased endorsement of growth mindset, transmission, or recursive process. Participants demonstrated decreased PSA and increased SPPSC scores, supporting H3. The effect size for was small for PSA and moderate for SPPSC (see Table 5).

Table 4

Correlations for All Measures on Pre-Semester Survey (Below the Diagonal) and Post-Semester Survey (Above the Diagonal)

	1.	2.	3.	4.	5.	6.	7.
1. Mindset	--	-.14**	-.25**	.20**	.18**	.31**	.27**
2. Apprehension	-.09*	--	.05	-.15**	.13**	.14**	-.35**
3. Transmission	-.20**	.05	--	.06	.11*	-.02	-.08
4. Transaction	.26**	-.12**	.17**	--	.24**	.22**	.22**
5. Recursive	.15**	.26**	.15**	.29**	--	.45**	.11*
6. Audience	.30**	.16**	-.03	.23**	.46**	--	.29**
7. Competence	.25**	-.36**	-.02	.18**	.02	.15**	--

Note. $^{*}p < .05$. $^{**}p < .01$.

Table 5

Univariate RM-ANOVAs and Descriptive Statistics for All Measures

	RM-ANOVA					Pre-Semester		Post-Semester	
Measure	*MS*	*df*	$F_{(1,393)}$	*p*	η_p^2	*M*	*SD*	*M*	*SE*
Mindset	0.51	1	0.91	.34	.00	4.06	0.76	4.12	0.96
Apprehension	7.72	1	10.95	.001*	.03	3.67	0.96	3.48	1.15
Transmission	3.05	1	5.54	.02	.01	3.02	0.99	3.15	1.07
Transaction	19.41	1	28.35	<.001*	.07	3.57	0.83	3.88	1.19
Recursive	0.11	1	0.33	.57	.00	4.26	0.75	4.18	0.75
Audience	3.32	1	11.59	.001*	.03	4.34	0.53	4.47	0.69
Competence	12.95	1	44.80	<.001*	.10	3.35	0.70	3.61	0.68

Note. $N = 394$. $^{*}p < .007$, using the Bonferroni adjustment for protection of an experiment-wise error rate (α_e) of .05.

H4: Growth Mindset and PSA and SPPSC

H4 predicted that higher growth mindset would be associated with lower PSA and higher SPPSC. At the start of the semester, growth mindset was significantly associated with lower PSA (r = -.09) and higher SPPSC (r = .25) (see Table 4). At the end of the course, growth mindset continued to be significantly associated with lower PSA (r = -.14) and higher SPPSC (r = .27), supporting H4.

RQ1 and RQ2: Predicting PSA and SPPSC

Regressions were performed as above (see Table 6). The linear combination of predictors for end of semester PSA was statistically significant, $F(5,413) = 6.62$, $p < .001$, $R^2 = .07$, adjusted $R^2 = .06$. Both recursive process (B = 0.25, SE = 0.08, $p < .05$) and transaction beliefs (B = -0.32, SE = 0.07, $p < .05$) had significant partial effects on PSA. Stronger initial recursive process beliefs were associated with higher PSA at the end of the semester, and stronger initial transaction beliefs were associated with lower PSA at the end of the course.

The linear combination of predictors for end-of-semester SPPSC was also statistically significant, $F(5,415) = 2.35$, $p = .04$, $R^2 = .03$, adjusted $R^2 = .02$. Only transaction beliefs had a significant partial effect on SPPSC (B = 0.09, SE = 0.04, $p < .05$)—stronger initial endorsement of transaction beliefs was associated with higher SPPSC at the end of the semester.

Table 6

Relationships between Growth Mindset and Beliefs about Public Speaking on End-of-Semester Apprehension and Competence and Change in Apprehension

	Apprehension				Competence				Δ Apprehension			
Measure	*B*	*SE B*	*β*	sr^2	*B*	*SE B*	*β*	sr^2	*B*	*SE B*	*β*	sr^2
Mindset	-0.03	0.08	-0.02	0	0.06	0.05	0.1	0	0.114	0.08	0.08	0
Transmission	0.11	0.06	0.1	0.01	-0.02	0.04	-0	0	0.057	0.06	0.05	0
Transaction	-0.32	0.07	-.23*	0.05	0.09	0.04	.12*	0.01	-0.08	0.07	-0.05	0
Recursive	0.25	0.08	.16*	0.02	-0.06	0.05	-0.1	0	-0.09	0.09	-0.06	0
Audience	-0.06	0.12	-0.03	0	0.08	0.07	0.1	0	-0.29	0.13	-.13*	0.01
Constant	3.57	0.53			3	0.32			1.05	0.55		

Note. *p < .05. sR2 = squared part correlations, which indicate the unique variance predicted by the independent variable.

The linear combination of predictors for ΔPSA had a statistically significant effect, $F(5,413) = 2.48$, $p = .03$, $R^2 = .03$, adjusted $R^2 = .02$. Only audience orientation beliefs had a significant partial effect ($B = -0.29$, $SE = 0.13$, $p < .05$)—stronger initial audience orientation beliefs were associated with a larger reduction in PSA.

The linear combination of predictors of ΔSPPSC had no statistically significant effect, $F(5,393) = 1.90$, $p = .09$, $R^2 = .02$, adjusted $R^2 = .01$.

Discussion

As hypothesized, growth mindset was associated with more sophisticated beliefs about public speaking—lower endorsement of transmission and higher endorsement of transaction, recursive process, and audience orientation beliefs. Growth mindset was also associated with lower PSA and higher SPPSC. Also, again replicating prior research, PSA increased and SPPSC decreased from the beginning to the end of the semester. However, these effect sizes were notably smaller than they were for the intensive format. Similarly, only endorsement of transaction and audience orientation beliefs significantly increased over the course of the semester. These results are consistent with previous findings that intensive formats may be more effective than traditional formats, at least in the short term (Seamon, 2004).

Unlike in the intensive format, initial beliefs about public speaking did predict PSA and SPPSC outcomes, although these effects were small. Initial transaction beliefs were associated with lower PSA and higher SPPSC at the end of the semester, suggesting that interventions designed to bolster the belief that public speaking is a cognitively engaging activity may result in improved outcomes in PSA and SPPSC. Greater endorsement of audience orientation beliefs was associated with greater reductions in PSA, suggesting that interventions to bolster these beliefs may also lead to improved outcomes in PSA. However, higher recursive process beliefs were associated with higher PSA. This finding may seem counterintuitive, since more rehearsal is associated with better public speaking performance (Menzel & Carrell, 1994). However, it is consistent with research showing that some rehearsal practices can be maladaptive, thus increasing rather than reducing apprehension (Daly, Vangelisti, & Weber, 1995; Pearson, Child, & Kahl, 2006).

General Discussion

Overall, students in these studies who more strongly endorsed a growth mindset were less apprehensive and more confident in their public speaking skills. Moreover,

these students tended to endorse more sophisticated beliefs about public speaking. Rather than simply reporting what experts think, these students emphasized iteratively developing their own thoughts while remaining sensitive to their audience. These findings build on prior research on mindsets in written and oral communication and highlight the importance of implicit theories of communication that emphasize malleability and growth. Additionally, they also show that public speaking instruction not only decreases PSA and increases SPPSC, but also reinforces other beliefs about the nature and purpose of public speaking.

Important differences between the intensive and traditional formats were also revealed. In particular, whereas students in the intensive format showed fairly substantial reduction in PSA and increase in SPPSC, these changes were much smaller in the traditional format, especially for PSA. Similarly, students in the traditional format showed no change in growth mindset, transmission, or recursive process beliefs and only small changes in transaction and audience orientation beliefs. Although these results suggest that the intensive format may be more effective than the traditional format, at least for immediate outcomes, other findings might favor the traditional format. Specifically, students in the intensive format did not seem to appreciate the link between rehearsal and improvement (i.e., growth mindset), whereas greater initial endorsement of transaction and audience orientation beliefs seemed to benefit students in the traditional format, but not the intensive format.

In the traditional format, stronger initial endorsement of recursive process beliefs was associated with higher PSA at the end of the semester. This finding is consistent with prior findings about the potential bad habits of apprehensive students. Highly apprehensive public speakers spend more time preparing than low apprehensive speakers but spend that time in less productive ways. These students tend to over-prepare their text and notes, over-emphasize potential constraints on their speech (e.g., type of equipment available), and under-prepare in terms of rehearsing silently or making adaptations to their audience (Ayres, 1996; Daly et al., 1995; Pearson et al., 2006). Although we did not collect data on student preparation practices, it seems likely that stronger endorsement of recursive process beliefs before receiving any instruction is related to at least some of these maladaptive practices.

Limitations

There are several limitations to the present studies that need to be discussed. First, all of these participants are from a single institution and taking some version of

the same public speaking course. Therefore, we cannot necessarily generalize to students at other institutions or in other public speaking courses. It should be noted, however, that the results for H3, showing reduction in PSA and increase in SPPSC replicates findings from other institutional contexts and courses.

It is also important to note that the reliabilities for transmission beliefs and SPPSC were low, so therefore, findings regarding these variables should be treated cautiously. The reliabilities for transmission beliefs were consistent with, or even improved upon, those reported by Sanders-Reio et al. (2014), however. The lower reliabilities for the SPPSC scale are consistent with previous studies using McCroskey and McCroskey's (1989) Self-Perceived Communication Competence Scale which have not found high reliabilities for its public speaking or other sub-scales. Ellis' (1995) SPPSC scale included 19 items and reported substantially higher alphas, but only four items in our scale were supported in a previous factor analysis with students from the same institution (Stewart et al., 2017). It may be the case that self-efficacy, rather than SPPSC, is a better outcome variable for future research. Dwyer and Fus (2002), for instance, found that self-efficacy, but not SPPSC, was associated with student final grades.

Finally, the regression analyses, although statistically significant, accounted for only a small amount of variance. However, if replicated, small effects can still be important both theoretically and practically (Aronson, Ellsworth, Carlsmith, & Gonzales, 1990).

Conclusions

Because growth mindset is associated with more sophisticated beliefs about public speaking, instructors may wish to encourage growth mindsets among their students. Instructors may emphasize in their instruction that public speaking is a skill that can be grown through practice and effort or aim to reinforce student successes with praise that emphasizes practice and effort ("you really put a lot of time and effort into preparing that speech, and it paid off") rather than innate talent ("you are a naturally gifted public speaker"). However, as Dweck (2015) warns, instructors should avoid praising effort that does not lead to successful learning, but should instead, when students are not succeeding, offer different strategies for tackling challenges.

Public speaking instructors or students who are primarily interested in reducing PSA and/or increasing SPPSC may prefer an intensive format, as our results suggest greater efficacy for these outcomes compared to the traditional format. However,

although students in the intensive format experience greater changes in PSA and SPPSC, the traditional format may afford benefits for students who begin the course with stronger transaction and audience orientation beliefs. Public speaking instructors may also wish to design and implement lessons or activities that reinforce transaction and audience orientation beliefs early in the course. Encouraging students to believe that public speaking will help them develop new ideas and better understand their own thoughts and opinions may reduce apprehension and improve self-confidence in their public speaking. Likewise, helping students recognize the need to orient to and adapt to their audience may also lead to greater reductions in PSA.

Public speaking instructors must also be careful not only to reinforce a belief in the importance of revision and rehearsal, but to ensure that this belief is coupled early on with practices that reduce rather than increase apprehension (e.g., focusing on practicing delivery rather than obsessing over exact wording; Daly et al., 1995; Pearson et al., 2006). However, as Pearson et al. (2006) note, there is little empirical evidence on what student preparation practices are most effective in reducing public speaking apprehension.

Finally, institutions of higher education seeking to instill growth mindsets in their students to increase retention and graduation rates can benefit from understanding in what domains and courses students are likely to hold fixed or growth mindsets. If students are indeed predisposed to perceive public speaking as a "growable" skill through practice and effort, then public speaking classes may offer an excellent site for *reinforcing* such mindsets. By leveraging students' understanding of the malleable nature of challenging and potentially daunting public speaking abilities, perhaps educators can help them appreciate that many (or most!) complex skills can be similarly nurtured.

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