# Public Speaking Apprehension (PSA), Motivation, and Affect among Accounting Majors: A Proof-of-Concept Intervention

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**ABSTRACT:** The importance of public speaking (PS) skills to professional accounting success motivates improving students' self-perceptions of these skills. In addition, evidence of higher levels of public speaking apprehension (PSA) among accounting majors makes understanding and working with students' affective (emotive) reactions to PS critical to their future success. In three studies, we design and implement an intervention based on principles from self-determination theory (SDT) and motivational interviewing (MI). Its purpose is to improve students' PSA and PS motivation; it includes substantive PS instruction, dialogues, nonjudgmental feedback, and interpersonal support. The results of the three "proof-of-concept" interventions (Study 1, n = 23; Study 2, n = 14; Study 3, n = 36) suggest improvements in students' perceptions of their PS cognition, motivation, and affect. Despite the limitations of self-reported measures and exclusively graduate participants, the results suggest that (1) the interventions, described in appendices, may merit replication and extension, and (2) SDT- and MI-based interventions may prove useful in addressing aspects of accountancy pedagogy that induce student apprehension.

# **INTRODUCTION**

Public speaking (PS) is an important determinant of professional accounting success. For example, practice analyses and surveys indicate that oral communication is a core function of professional accounting work (Albrecht and Sack 2000; National Center for O\*NET Development 2007; Siegel and Sorensen 1999). Accordingly, building communication skills is of essential import to accounting students and the accounting curriculum. In this paper, we focus on a subset of the communication skills needed for professional success in accounting. Specifically, we investigate whether an intervention based on motivational interviewing (MI) and self-determination theory (SDT) increases PS motivation and reduces PSA (public speaking apprehension).

Oral communication apprehension (OCA) includes four related fears: group discussion, meetings, interpersonal communication, and PS (McCroskey 1982; Aly and Islam 2003, 2005; Gardner et al. 2005). The clinically diagnosable fear of PS, called glossophobia, is the most common adult phobia (irrational fear). For example, Stein et al. (1996) surveyed

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499 Canadian residents and found evidence of glossophobia among one-third of respondents. Evidence suggests that PS fear is more common than is the fear of death. For example, large sample survey data indicates that about 42 percent of respondents had PSA while only 19 percent feared death (Wallechinsky et al. 1977, 469–470). These data suggest that Jerry Seinfeld's quip that "the average person at a funeral would rather be in the casket than doing the eulogy" may not be hyperbole (Wikipedia 2007). PS fear is not unique to the untrained and uneducated; it is also common among senior managers (Anonymous 2007; Huber 2005).

Learning is often complicated by students' cognitive (e.g., distracting thoughts) and affective (e.g., fear) anticipations of and responses to learning content and educational environments. Reducing glossophobia and improving PS skills is difficult because of the complex interaction of cognitive, affective, and physiological anticipations and responses to PS. Human and mammalian anticipations of and reactions to stressful events are often referred to as the "fight or flight" response (Marmot and Wilkinson 2006). Glossophobia is a dysfunctional reaction to the fight or flight response; it is characterized by negative cognitions (e.g., "I'm going to fail.") and negative affect (e.g., feelings of fear and incompetence). These mental changes are preceded, or triggered, by physiological and biological stress responses that include an increased heart rate and the release of cortisol into the blood stream, which increases blood pressure, blood sugar levels, and suppresses autoimmune and immune system responses (al'Absi et al. 1997; Buchanan et al. 1999; Beatty and Behnke 1991).<sup>1</sup> These complex mental and physiological changes increase PSA and reduce PS motivation, i.e., one's willingness to seek or accept opportunities to speak in public.

SDT provides a psychological theory, and MI a set of methods from counseling practice that are, to our knowledge, unexplored but potentially efficacious in addressing the psychological and physiological impediments to reducing PSA and improving PS effectiveness. SDT and MI, when combined with concurrent PS instruction, may be useful in addressing the complex nexus of affective, cognitive, motivational, and substantive learning impediments to PS success. These methods are potential alternatives, or supplements, to existing methods such as systematic desensitization (e.g., McCroskey et al. 1970; McCroskey et al. 1983) that are efficacious in reducing PSA.

Herein, we report the results of three intervention variations based on SDT principles and MI practices. The semester-long interventions are designed to develop PS skills and reduce PS anxiety. Although subject to a set of important limitations, our results suggest that the interventions increased student confidence in, and reduced their anxiety about, PS. The results may justify replication and extension to other accounting curriculum applications where affect, e.g., fears, impedes learning. For example, affective responses may impede the learning of "social" or "emotional" intelligence (Goleman 1995, 2000; Stone et al. 2000) or impede preparation for the CPA examination.

Five sections follow this introduction: (1) "Motivation and Literature Review," which explores evidence related to the importance of PS skills and PSA on professional accounting success, (2) "Theory and Hypotheses," which discusses the theory that underlies our interventions, hypotheses, and metrics, (3) "Research Method," which discusses the intervention methods and differences, (4) "Results," including benchmarking against our previous results, and (5) "Limitations and Conclusions."

<sup>&</sup>lt;sup>1</sup> See also Weick (1983) for a general discussion of the importance, and deleterious effects of, stress in accounting work.

### MOTIVATION AND LITERATURE REVIEW Public Speaking (PS) in Accountancy

Critical thinking, communication, and interpersonal skills are critical to professional accounting success (e.g., Albrecht and Sack 2000; Big 8 Accounting Firms 1989; National Center for O\*NET Development 2007; Siegel and Sorensen 1999).<sup>2</sup> Recent research reemphasizes the importance of communication skills to professional accountancy. For example, Blanthorne et al. (2005) surveyed 402 public accounting partners on the importance of six skill sets (technical, communication, interpersonal, administrative, leadership, and practice development) in promotion decisions from staff to senior, senior to manager, and manager to partner. Communication was the second most important skill in promotions from senior and manager and the third most important skill in promotions to partner.

Some curriculum efforts funded through the Accounting Education Change Commission (AECC) included greater attention to the development of PS skills (Williams and Sundem 1990; AECC 1992). For example, Johnson et al. (2003) found that, perhaps partially in response to the AECC, requirements for student presentations in introductory auditing classes increased by 110 percent from 1987 to 2000 (from 20 to 42 percent). Additionally, Grace and Gilsdorf (2004) provide exercises designed to improve students' PS confidence and performance.

Accountancy majors may have higher levels of oral communication apprehension (OCA) and PSA than do other college majors. For example, Stanga and Ladd (hereafter SL) (1990) assessed the oral communication apprehension of 845 introductory accounting students at one university. Accounting majors had higher OCA and PSA compared to other study participants. Simons et al. (1995) compared the OCA and PSA of 233 accountancy majors with that of four other business disciplines (n = 95, finance; n = 188, management; n = 103, marketing; and n = 91, other). Results indicated that accountancy majors had higher OCA and PSA than all other majors except management. Ruchala and Hill (hereafter RH) (1994) reported that the pre-intervention PSA of their accounting major participants (n = 43) is higher than both national norms and the accounting major (n = 161) data reported in SL. Accordingly, evidence from three samples suggests that higher levels of OCA and PSA may exist among accounting majors than among other collegiate majors.<sup>3</sup> Further, large-sample Department of Labor occupational data indicates that professional accountants are less confident in their communication abilities than are other professionals (see e.g., Chen et al. 2009). Speculative reasons for higher levels of OCA and PSA among accounting majors may include student self-selection of a college major (e.g., Albrecht and Sack 2000) or a de-emphasis on the development of PS skills in accountancy compared to other curricula.

# **PSA Interventions**

Interventions designed to reduce PSA show efficacy from some intervention aspects. For example, Pittenger et al. (2004) provided classroom instruction in PS and taped examples of outstanding student presentations. Compared with a pre-intervention cohort, presentations by students in the treatment group were rated higher by the instructor and an outside professional evaluator. Sergenian and Pant (1998) implemented an intervention

<sup>&</sup>lt;sup>2</sup> The need for PS skills as an entry-level skill needed by public accountants is also discussed in Roy and MacNeill (1963, 1966, 1967); results of a survey published in 1967 of 1,890 participants finds that written and oral communication ranks first in importance to the beginning CPA compared to 52 other academic areas.

<sup>&</sup>lt;sup>3</sup> Additional relevant accounting literature includes May and May (1989), who surveyed 263 accountancy programs regarding current and planned efforts to improve communication skills, and Smythe and Nikolai's (1996, 2002) qualitative studies of oral communication concerns among three accounting constituencies.

among students from disadvantaged socioeconomic backgrounds that was designed to improve four aspects of students' professionalism: career knowledge, job search process, team learning, and communication skills. The PS intervention consisted of students presenting with self- and peer-evaluations of the presentations. Comparison of pre- and post-measures of self-evaluations of presentation and oral communication skills indicated improvement consistent with intervention success. Smith and King (2004) examined student reactions to the wording of critiques of their PS performance. Results indicated that more respectful, less pejorative critiques improved PS performance more than did less respectful, more pejorative critiques.

Alternatively, however, McCroskey and colleagues (for a summary, see McCroskey et al. 1983) provide evidence from 15 years of research that while systematic desensitization techniques reduce OCA and PSA, communication courses that do not include elements that specifically address the affective (emotional) components of PS are ineffective at reducing OCA and PSA. Consistent with McCroskey et al.'s (1983) findings, evidence suggests that accounting education, in the absence of specific curriculum interventions, has no effect on OCA. For example, Aly and Islam (2003) administered the Personal Report of Communications Apprehension (PRCA-24) instrument, which assesses OCA and PSA, to 151 first-year, 125 final-year, and 58 graduate students in accountancy. Results indicated no differences in OCA among the three samples. Similar results are reported among non-U.S. samples of accounting students (Hassall et al. 2000; Gardner et al. 2005; Aly and Islam 2005).

Based on a review of previous literature, SL (1990) recommended three intervention strategies that they argued would be useful in reducing OCA: assertiveness training, systematic desensitization, and cognitive restructuring. Assertiveness training and cognitive restructuring are both cognitive approaches to reducing OCA. Assertiveness training explicitly focuses on skill development, such as improving "eye contact, distance between communicators, facial expression, gestures, and postures and body orientation." Cognitive restructuring consists of identifying "negative self-statements [that] represent irrational overgeneralizations" (SL 1990, 190) and recasting these as positive statements. Students practice rethinking and refuting negative self-statements in thought experiments and role-playing exercises. Systematic desensitization implementations attempt to reduce OCA through, primarily, inducing changes in affective responses. Interventions involve progressively imagining more stressful PS situations while maintaining a state of deep relaxation. This method associates the stressor event with a relaxed state, instead of the previous high-arousal, negative affective state.

We are aware of one accounting curriculum intervention that successfully reduced OCA among accounting students. RH (1994) designed and implemented an intervention to reduce OCA that included assertiveness training, trust-building, and social support (see RH 1994, 288–289) across four exercises: cold classroom calls, meetings and discussions with visiting professionals, office visits and interviews of professionals, and oral presentations. Intervention participants were students in an advanced managerial accounting class; control group participants were Beta Alpha Psi members not enrolled in the class. Pre- to post-intervention comparisons supported the intervention's success in reducing OCA and PSA.

We next describe an alternative intervention based in differing core principles and methods from that of RH (1994) that is designed to improve PS skills and motivation, and reduce PSA, among accountancy students. Our focus is on PSA, not OCA. To increase internal validity, e.g., to test for halo effects from the intervention, we also collect and report measures of OCA.

# THEORY AND HYPOTHESES

# A Self-Determination Theory (SDT) and Motivational Interviewing (MI)-Based Intervention to Reduce PSA

SDT is rooted in a set of explicit assumptions about human nature and motivation (e.g., Deci and Ryan 1985, 2008; Ryan and Deci 2000). Humans are inherently motivated to grow and achieve, and will fully commit to and engage in even uninteresting tasks when their meaning and value is understood. According to SDT, humans have three core psychological needs: competence, relatedness, and autonomy. Competence concerns the belief that one has the ability to influence important outcomes. Relatedness concerns the need to have satisfying and supportive social relationships. Finally, autonomy does not refer to independence, but rather to the necessity of volitional choice of inter- or independence.

Satisfying human needs for autonomy, competence, and relatedness creates sustainable, enduring motivation and reduces negative, performance-related affect. Increasing self-perceived autonomy, competence, and relatedness increases productivity, creativity, and happiness (Deci and Ryan 1985; Ryan and Deci 2000). For example, within education, an SDT-based intervention increased students' interest and engagement in learning activities (Reeve et al. 2004) and improved student learning in medical school (Williams and Deci 1998). Evidence also suggests that students who perceive their instructors as more supportive become more autonomous in their own learning, which also increases self-perceived competence (Williams and Deci 1996).

Self-determination theory (SDT) is closely aligned with a set of clinical psychology practice methods called "motivational interviewing" (MI) (Vansteenkiste and Sheldon 2006; Markland et al. 2005). MI is a client-centered counseling style that assists clients in addressing problematic behaviors that impede their success and happiness (Moyers 1998; Rollnick and Miller 1995). While the original application of MI was to alcoholism, MI has found increasing application in counseling and education (Miller and Rollnick 2002). According to Miller et al. (1992), the core principles underlying MI are:

- 1. Express empathy. Teachers and counselors work to see the world through the students' or clients' eyes and to understand the students' or clients' feelings and experiences.
- 2. Support self-efficacy. Teachers and counselors support students' and clients' realistic beliefs that meaningful change is possible and achievable.
- 3. Roll with resistance. Expressions of skepticism and doubt are never challenged or disputed, but are reacted to with empathy and encouragement.
- 4. Develop discrepancy. Meaningful change occurs when students or clients perceive discrepancy between current and desired behaviors. Teachers and counselors make salient the discrepancy between students' and clients' current and desired behaviors.

Some argue that SDT lacks corresponding practical (i.e., clinical and pedagogical) methods while MI lacks an underlying theory. Because of the close linkages between SDT and MI, we applied and adapted constructs and methods from both sources. To our knowledge, SDT and MI have not been applied to improving self-perceived PS skills and reducing PSA. However, previous applications of SDT and MI to creating learning environments that provide interpersonal and emotional support, along with substantive instruction (Black and Deci 2000; Williams and Deci 1996, 1998) appear uniquely suited to addressing PSA. Both SDT and MI emphasize the creation of an environment that acknowledges and supports individual feelings of autonomy, competence, and relatedness. We designed and implemented three variations of an SDT- and MI-based intervention as a "proof-of-concept"

of the possibility of using SDT and MI principles to accomplish these goals. The interventions included methods intended to support core psychological needs, as well as providing substantive instruction in PS skills.

Herein, we report the results of the three studies. Compared with the Study 1 intervention, the Study 2 and Study 3 interventions were simpler; they reduce instructor effort. Table 1 compares the theories, conceptual principles, and target-dependent constructs that underlie these interventions with those implemented in RH (1994) and proposed in SL (1990).<sup>4</sup> We identify seven possible "molar" intervention elements that might be included in OCA or PS interventions (Table 1, Column a). Table 1, Column b, identifies the theoretical source for the intervention, while Table 1, Column c, identifies the target (dependent) construct of the intervention element. The checked boxes in Table 1, Columns d, e, f, g, and h, identify which studies propose (SL, Column d) or implement these intervention elements, where Columns e, f, g, and h map to RH (Column e), Study 1 (Column f), Study 2 (Column g), and Study 3 (Column h), respectively.

Of the seven molar intervention elements, five are common to RH's and at least one of our studies, while one, cognitive restructuring, is proposed in SL and implemented in our Study 1. One intervention with demonstrated previous efficacy in reducing PSA, systematic desensitization, is not implemented in either RH's or our interventions. Our and RH's conceptual interventions (see Table 1) are similar. However, the theoretical principles of our SDT- and MI-based approaches differ somewhat from that of RH, as do the actual intervention exercises and activities and many of the dependent measures. In addition, we focus exclusively on PSA and PS skills; RH's intervention concerns OCA.

We investigate the effectiveness of three slightly differing implementations of an experimental intervention designed to reduce PSA and improve students' affective, cognitive, and motivational responses to PS. We test H1 through H3 in all three studies; we test 12 additional hypotheses in Studies 2 and 3 to reduce the extent of mono-measurement bias (cf., Shadish et al. 2002) and to enable direct comparison with previous research results. Tests of hypotheses contrast pre- with post-intervention measures.

We reduce the potential threats of mono-operation (i.e., implementation) bias and the unreliability of treatment implementation (cf., Shadish et al. 2002) by implementing the intervention in slightly differing form with three cohort groups. Implementing the treatment with three cohort groups decreases the likelihood that the results can be attributed to sampling, random, or Beta error (Cohen 1969, 1988).

#### **Hypotheses**

# Hypotheses 1 through 3 (Tested in All Studies): PS Motivation and Positive and Negative Self-Statements (SS)

In all studies, we measure and test for improvements in two sets of measures:

- 1. PS motivation, with measures adapted from Ryan et al. (1999) and Kasser and Ryan (1993), and
- 2. PS positive and negative self-statements (SS), with measures adapted from Hofmann and DiBartolo (2000).

<sup>&</sup>lt;sup>4</sup> Table 1 provides a "molar," not "molecular," (see Shadish et al. 2002) analysis of possible PSA causal interventions. Molar causation relates to naturally occurring treatments or causes that are not easily, commonly, or usefully separated into molecular causal agents. For example, the success of a classroom lecture might be attributed to the quality of the presentation (a molar cause), or to the decibel levels and frequencies in the sound waves that emanated from the instructor's larynx and diaphragm, as disseminated through a mixed nitrogen and oxygen atmosphere (a molecular cause).

$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
1	$\checkmark$	$\checkmark$	
$\checkmark$			$\checkmark$
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 TABLE 1

 Comparison of Proposed or Implemented PSA Interventions in Five Studies

 (1)
 (1)

PS = public speaking.

Appendix A, Panel 1, presents these measures; we predict that the SDT- and MI-based intervention will:

H1: Increase participants' PS motivation.

H2: Increase participants' positive PS SS.

H3: Decrease participants' negative PS SS.

# Measures and Hypotheses in Studies 2 and 3: OCA, PSA, Affect, and PS Sub-Domain Skill

In Studies 2 and 3, we add three sets of measures to reduce mono-measurement bias and enhance comparability with previous research: an assessment of OCA and PSA (PRCA-24) (Appendix A, Panel 3), a state (not trait) PS-related assessment of positive and negative affect (PANAS) (Appendix A, Panel 4) (Watson et al. 1988), and an assessment of PS selfperceived performance in six sub-domains (Appendix A, Panel 2).

#### OCA and PSA: Hypotheses 4 through 7

Adding the PRCA-24 increases the comparability of our intervention to existing communication and accounting research (e.g., Simons et al. 1995; Fordham and Gabbin 1996; Hassall et al. 2000; Gardner et al. 2005; Arquero et al. 2007; RH 2004; SL 1990). In addition, the PRCA-24 assesses both OCA and PSA. Since our interventions are targeted at PSA, collecting the PRCA-24 allows us to: (1) assess whether there are halo, i.e., crossover improvements, from our intervention on three other oral communication dimensions: group discussion, meetings, and interpersonal communication, and (2) control for the possibility that improvements in the treatment groups, if any, may be explained by effects that are unrelated to intervention, e.g., group maturation or history (Shadish et al. 2002).

Hypotheses 4 through 6 predict that the intervention, which is designed to decrease PSA, will not impact the three dimensions of OCA that are unrelated to PSA: group discussion, meetings, and interpersonal communication. Hypothesis 7 predicts that the intervention will decrease PSA. Specifically, we predict that the SDT- and MI-based intervention will:

H4: Result in no pre- to post-intervention changes in OCA in the domain of meetings.

- H5: Result in no pre- to post-intervention changes in OCA in the domain of groups.
- **H6:** Result in no pre- to post-intervention changes in OCA in the domain of interpersonal communication.

H7: Result in a decrease from pre- to post-intervention in the domain of PSA.

#### Affect: Hypotheses 8 and 9

The PANAS assesses positive and negative affect (emotion); it has been validated and extensively applied (Watson et al. 1988) including to PS (Mano 1991, 1992). As applied in our study, the PANAS directly measures PS-related affect (cf., Mano 1991, 1992). In it, participants rate feeling states along two dimensions, using positive (dimension 1) and negative (dimension 2) emotion-laden adjectives (see Appendix A, Panel 4, for instrument). Participants high in positive affect have high energy, strong concentration, and pleasurable engagement, whereas low positive affect is characterized by sadness and lethargy. Alternatively, high negative affect indicates anger, contempt, disgust, or fear, whereas low negative affect is characterized by calmness and serenity (Watson et al. 1988). We predict that the SDT- and MI-based intervention will:

H8: Increase PS positive affect from the initial to the final presentation assessment.

H9: Decrease PS negative affect from the initial to the final presentation assessment.

# PS Sub-Domain Skill: Hypotheses 10 through 15

Finally, we obtain pre-intervention and post-intervention measures of participants' selfperceptions of their skill in six specific aspects of PS performance: appearance, audience, structure, content, visual aids, and slides. We predict that students' self-perceived PS skills will improve in all measured aspects. Specifically, the SDT- and MI-based intervention will:

H10: Increase pre- to post-intervention self-perceived skill in the domain of appearance.

H11: Increase pre- to post-intervention self-perceived skill in the domain of audience.

H12: Increase pre- to post-intervention self-perceived skill in the domain of structure.

H13: Increase pre- to post-intervention self-perceived skill in the domain of slides.

H14: Increase pre- to post-intervention self-perceived skill in the domain of visual aids.

H15: Increase pre- to post-intervention self-perceived skill in the domain of content.

We next describe the research method of three studies.

# **RESEARCH METHOD**

### Participants

Participants are from three cohorts of Masters of Accountancy classes in consecutive years. Studies 1, 2, and 3 included 23 (11 male, 12 female), 14 (five male, nine female), and 36 (17 male, 19 female) participants, respectively, for a total of 73 (33 male, 40 female) participants. To increase the statistical power (Cohen 1969, 1988) of the intervention and reduce the likelihood of Beta error, all participants were assigned to the treatment condition—there was no within-study control group. To enhance experimental control and lessen potential threats to validity, where possible, we compare our results with those of previous investigations that assess the same measures.

# **Intervention Development and Description**

Appendix B describes the training undertaken in support of the development of the intervention. Each intervention was implemented over a single, 15-week semester. Study 2 and Study 3 changes in the intervention were designed to test whether decreasing some intervention aspects could be eliminated without diminishing its effectiveness. Therefore, the Study 1 intervention required the most instructor effort, which decreased in Study 2 and decreased again in Study 3. The interventions in each of the studies were as follows.

#### Study 1 Intervention

Study 1 included the following interventions (see Appendix C for additional description):

*Week 1.* Pre-intervention assessments were collected during the first week of the semester, prior to distribution of the class syllabus. The intervention began with the distribution of the class syllabus, which, consistent with SDT and MI principles, acknowledged students' fears about PS (i.e., support for relatedness, support desire for building competence) and provided information about impediments to and strategies for developing PS skills. *Week 2* emphasized students' choice (i.e., autonomy) to work on presentation skills or not, and solicited their thoughts and feelings about this work (Miller and Rollnick 2002; Reeve 2002; Reeve et al. 2004). During this week, students completed an online instrument that asked whether they were committed to improving their presentation skills. Participants who committed to read material related to improving their presentation skills. Participants who committed to work on these skills (n = 56 across all studies) had higher pre-intervention positive SS (p < .000) and motivation (p = .009) than participants who did not (n = 15).<sup>5</sup> The instrument also asked students whether points found in the readings were consistent with their own experience and whether and how the readings were useful in improving their PS skills.

*Week 3.* Students received a personalized email from the instructor that summarized the students' thoughts and feelings about PS that were expressed in the Week 2 activity. This exercise is aimed at facilitating dialogue, acknowledging and supporting feelings, and increasing awareness of PS-related SS (Miller and Rollnick 2002).

*Weeks 4 and 5.* Students presented during Week 4. The intervention focused on supporting feelings of competence (Reeve 2002; Reeve et al. 2004) related to these presentations. During Week 5, participants who committed to improving their presentation skills received individualized feedback (by email) on 25 dimensions of PS skill (see Appendix D).

*Week 8.* Participants met with the instructor, in groups, regarding the semester projects. For students who committed to improving their presentation skills, these meetings included a discussion of oral presentations and a brief, spontaneous presentation by each student participant. Following each presentation, the instructor offered observations and supportive comments based on MI principles (Miller and Rollnick 2002).

*Week 16.* Participants presented their semester projects. Post-intervention measures were collected after the presentation but prior to receiving a presentation grade and summary evaluation.

#### Study 2 Intervention

We modified two aspects of the Study 1 intervention for Study 2 (see Appendix E for additional descriptions).

*Week 3.* Writing and distributing the Week 3 email required  $\sim 20$  minutes per student. To reduce the instructor time required by the intervention and to increase its feasibility in larger-section classes, this aspect of the intervention was dropped.

*Week 4.* Consistent with suggestions in RH, the instructor obtained and used video recording technology for the Week 4 student presentations. The instructor reviewed selected portions of the videotape with students in Week 5, using nonjudgmental feedback principles from MI training (Miller and Rollnick 2002). This intervention required less instructor time than did the personalized email feedback completed in Study 1. Hence, the net instructor effort required by the intervention in Study 2 was lower than that of Study 1.

#### Study 3 Intervention

Study 3 replicated Study 2, but eliminated the Week 4 videotaping. Hence, Study 3 required the least instructor effort of the interventions.

<sup>&</sup>lt;sup>5</sup> Similar results obtain for students who choose to read PS-related material.

#### Measure Timing and Reliability

Measures were assessed pre- and post-intervention. The three common measures (see Appendix A, Panel 1) and the PRCA-24 (see Appendix A, Panel 3) were assessed, at preintervention, during the first week. Because they measure PS affect and PS-related self-perceptions, the "pre-intervention" PS PANAS (see Appendix A, Panel 4) and PS selfperception sub-domain (SPSD: see Appendix A, Panel 2) measures were assessed in Week 4 immediately following the participants' first presentations. Hence, our chances of finding effects on the PANAS and SPSD measures are lessened since the "pre-test" assessments occur in Week 4 of the intervention. Post-intervention measures were assessed after the final presentation but before students received a presentation grade and evaluation.

Appendix C presents construct reliability assessments for the Studies 1, 2, and 3, and the aggregated data set. Reliability was adequate to good, with the exception of four construct measures in specific studies; three Study 2 measures: (1) negative self-statements, (2) PRCA-24 measure of meetings, and (3) content domain self-assessment, and one Study 3 SPSD measure, visual aids. Given the smaller sample size and corresponding higher Beta error likelihood in Study 2, it is unsurprising that construct validity is lower in Study 2 than the other studies.

#### Ability

As an experimental control, we obtained data from the university registrar on participants' ability as measured by overall undergraduate grade point average (GPA), undergraduate accounting GPA, verbal/quantitative GMAT score, and GMAT analytical writing score (see Appendix A, Panel 5). Sample sizes for the ability measures were as follows: overall undergraduate GPA (n = 70), undergraduate accounting GPA (n = 34), GMAT scores (n = 70), and analytical writing (n = 28). An ANOVA to test for between-study differences indicates no difference in undergraduate accounting GPA, verbal/quantitative GMAT score, or GMAT analytical writing score. However, we do find a difference in overall undergraduate GPA. *Post hoc* analyses (Bonferroni correction) indicates that the overall undergraduate GPA is lower among Study 1, compared with Study 3, participants (Study 1 mean = 3.41, Study 3 mean = 3.66; p = 0.003).

#### Study 3: PS Sub-Domain (SD) Skill Scale Difference

PS SD skills were measured on a 1–5 scale (1 = poor, 5 = good) in Study 2, and at post-intervention in Study 3 (see Appendix A, Panel 2). However, due to a programmer error, the PS SD skills were measured on a 1–7 scale (1 = very poor, 7 = very good) at pre-intervention in Study 3. We followed suggestions in the scale development literature (Dawes 2002, 2008) to convert the seven-point scale used pre-intervention in Study 3 to the five-point scale used in the other cases. Specifically, we converted the seven- to a five-point scale with the following equation:  $((2/3) *((seven-point scale response) - 4) + 3).^6$ 

### RESULTS

We present (1) correlational analysis, (2) tests of hypotheses and related analyses, and (3) benchmark comparisons against prior studies. Tests of hypotheses were assessed using repeated-measure (i.e., intervention, which compares pre- with post-intervention) ANOVA

 $<sup>^{6}</sup>$  With this formula, the mapping of seven- to five-point scale values are [7, 5; 6, 4.3; 5, 3.7; 4, 3; 3, 2.3; 2, 1.7; 1, 1].

with Study (levels = 1, 2, 3), and the joint effect of study and intervention (pre- to posttest) as predictor variables.<sup>7</sup> We also compare between-study levels of the pre- and post-intervention measures using a multivariate GLM. Finally, we provide benchmark comparisons, using t-tests of our and (1) Hofmann and DiBartolo's (2000) positive and negative self-statement results, and (2) RH's and national norm results for the PRCA-24.

#### Correlations

Table 2 presents correlation results; Spearman correlations appear above the diagonal; Pearson correlations appear below the diagonal. Table 2, Panel A, presents pre- to postintervention correlational results for metrics that are common across all three studies. These correlations suggest adequate discriminant validity among constructs (highest correlation ~0.52).<sup>8</sup> Table 2, Panels B through E, presents the correlations among the additional Study 2 and Study 3 measures. Consistent with previous criticism of the PRCA-24 (e.g., Hofmann and DiBartolo 2000), there are some high correlations (~0.7) among subcomponents on the PRCA-24 (see Table 2, Panel B).

#### **Tests of Hypotheses and Related Analyses**

Recall that data from all three studies are available for the tests of H1 through H3. Hypotheses 1 and 2 predict increases in pre- to post-intervention PS motivation and positive SS; H3 predicts a decrease in pre- to post-intervention PS negative SS. The results support H1, H2, and H3 (PS motivation p < 0.000, positive SS p = 0.005, negative SS p = 0.026; see Table 3, Panel A). There are no effects due to study and no intervention by study interaction effects in the tests of H1 through H3.<sup>9</sup>

Recall that data from Studies 2 and 3, but not 1, are available for the tests of H4 through H15. Hypotheses 4 through 6 predict no pre- to post-intervention differences in the PRCA-24 domains of meetings, groups, and interpersonal communication; H7 predicts pre- to post-intervention improvements in PSA. Hypotheses 4 through 7 are supported (see Table 3, Panel B). Accordingly, these results provide some evidence of intervention success and discrimination, and lessen the likelihood that pre- to post-intervention changes can be explained as resulting from internal validity confounds such as maturation or history (cf., Shadish et al. 2002). There are no effects due to study and no intervention by study interaction effects in the tests of H4 through H6. However, we find a significant study effect for PSA (p = 0.027). To further investigate this effect, we ran a multivariate GLM to determine whether these differences occur at pre-intervention, post-intervention, or both. Results indicate no between-study differences in pre-intervention PSA, but lower post-intervention PSA in Study 2 than in Study 3 (p = .013).

Hypothesis 8 predicts pre- to post-intervention increases in positive affect; H9 predicts pre- to post-intervention decreases in negative affect. Consistent with H8, pre- to post-intervention positive affect increases (p = .012). However, in contrast to H9, negative affect

<sup>&</sup>lt;sup>7</sup> As a test of robustness, we reanalyzed these data using paired t-tests. The results better support the hypotheses but fail to control for between-study differences.

<sup>&</sup>lt;sup>8</sup> Kline (2005) argues that correlations greater than 0.85 indicate a discriminant validity problem.

<sup>&</sup>lt;sup>9</sup> We attempted to add ability as a covariate in our tests of Hypotheses 1 through 3, where we had the highest statistical power; the results suggest that we have insufficient degrees of freedom, i.e., Beta error is unacceptably high, for this analysis. For example, the realized statistical power for finding an effect due to the intervention, when omitting covariates, is 0.986, which is higher than the common suggestion of setting minimal statistical power = 0.80 (Cohen 1969, 1988). In contrast, when we add undergraduate GPA to the model to control for ability, the statistical power for finding an effect due to the intervention drops to 0.095. Similarly unacceptable low levels of statistical power obtain for all of the covariates that we collected and increase for the cases where we have data only in Studies 2 and 3.

# TABLE 2Pre- to Post-intervention Correlations

# Panel A: PS Positive and Negative Self-Statements and Motivation (n = 71 to 73)

	PS Motivation Pre-Intervention	PS Motivation Post-Intervention	Positive Self- Statements Pre- Intervention	Positive Self- Statements Post- Intervention	Negative Self- Statements Pre- Intervention	Negative Self- Statements Post- Intervention
PS Motivation Pre- Intervention		0.376***	0.549***	0.204*	-0.499***	-0.107
PS Motivation Post- Intervention	0.391***		0.538***	0.421***	-0.311***	-0.389***
Positive Self-Statements Pre-Intervention	0.515***	0.528***		0.343***	-0.466***	-0.153
Positive Self-Statements Post-Intervention	0.202*	0.479***	0.453***		-0.180	-0.280**
Negative Self- Statements Pre- Intervention	-0.511***	-0.353***	-0.529***	-0.325***		0.171
Negative Self- Statements Post- Intervention	-0.148	-0.473***	-0.302***	-0.416***	0.297**	

\*, \*\*, \*\*\* Significant at p < .10, p < .05, and p < .01, respectively (two-tailed). Pearson correlations below diagonal, Spearman above diagonal.

(continued on next page)

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# TABLE 2 (continued)

# Panel B: PRCA-24 Correlations (n = 50)

	Group Pre- Intervention	Group Post- Intervention	Meeting Pre- Intervention	Meeting Post- Intervention	Interpersonal Pre- Intervention	Interpersonal Post- Intervention	PS Pre- Intervention	PS Post- Intervention
Group Pre-Intervention		0.283**	0.670***	0.221	0.427***	0.210*	0.465***	0.247*
Group Post-intervention	0.421***		0.045	0.458***	0.017	0.542***	0.129	0.376***
Meeting Pre- Intervention	0.725***	0.177		0.235*	0.514***	0.048	0.377***	0.057
Meeting Post- Intervention	0.265	0.616**	0.255		0.100	0.388**	0.218	0.354*
Interpersonal Pre- Intervention	0.487**	0.131	0.605**	0.140		0.318*	0.162	0.034
Interpersonal Post- Intervention	0.291**	0.581***	0.091	0.413***	0.370***		0.029	0.159
PS Pre-Intervention	0.401***	0.137	0.390***	0.260*	0.158	0.025		0.521***
PS Post-Intervention	0.241*	0.311**	0.089	0.395***	0.070	0.184	0.544***	

\*, \*\*, \*\*\* p < .10, < .05, and < .01, respectively, Pearson correlations, two-tailed test significance. Pearson correlations below diagonal, Spearman above diagonal.

### Panel C: Correlations of PRCA-24 with PS Positive and Negative SS and Motivation (n = 50)

	Pre-Intervention				Post-Interventio	ntion
	PS Motivation	Positive Self- Statements	Negative Self- Statements	PS Motivation	Positive Self- Statements	Negative Self- Statements
Group Pre-Intervention	$-0.285^{**}$	$-0.432^{***}$	0.347**	-0.287**	-0.317**	0.170
Meeting Pre-Intervention	-0.354 **	-0.331**	0.347**	-0.223	-0.087	0.071
Interpersonal Pre-Intervention	-0.265*	$-0.382^{***}$	0.425***	-0.276*	-0.131	0.200
PS Pre-Intervention	-0.577 ***	-0.565 ***	0.439***	-0.374***	-0.317 **	0.136
Group Post-Intervention	-0.016	-0.295 **	0.254*	-0.149	-0.247*	0.302**
Meeting Post-Intervention	-0.081	-0.227	0.248*	-0.216	$-0.286^{**}$	0.242*
Interpersonal Post-Intervention	-0.060	-0.154	0.225	-0.279*	-0.190	0.282**
PS Post-Intervention	-0.230	-0.467***	0.232	-0.618***	-0.559 ***	0.453***

 $\overline{*, **, *** p} < .10, < .05, and < .01$ , respectively, Pearson correlations, two-tailed test significance.

# TABLE 2 (continued)

Panel D: Correlations among PRCA, PS Motivation, and Self-Statement Variables—Initial Presentation versus Post-Intervention or Final Presentation (n = 50)

	Initial Presentation								
Post-Intervention or Final Presentation	PRCA—Group	PRCA—Meetings	PRCA— Interpersonal	PRCA—PS	PS Motivation	Positive SS	Negative SS		
PRCA—Group	0.421***	0.177	0.131	0.137	-0.016	-0.295**	0.254*		
PRCA—Meetings	0.265*	0.255*	0.140	0.260*	-0.081	-0.227	0.248*		
PRCA—Interpersonal	0.291**	0.091	0.370***	0.025	-0.060	-0.154	0.226		
PRCA—PS	0.241*	0.089	0.070	0.544***	-0.230	-0.467 ***	0.232		
PS Motivation	-0.287 **	-0.223	-0.276*	-0.374***	0.374***	0.481***	-0.315 **		
Positive SS	-0.317 **	-0.087	-0.131	-0.317 **	0.185	0.473***	-0.195		
Negative SS	0.170	0.071	0.200	0.136	-0.068	-0.211	0.379***		
Appearance	-0.163	-0.051	-0.102	-0.167	0.001	0.176	0.073		
Audience	-0.098	0.058	-0.020	-0.071	-0.050	0.207	-0.054		
Structure	0.014	0.032	-0.042	0.255*	-0.299 **	0.001	0.161		
Content	0.138	0.203	0.114	0.424***	-0.403 * * *	-0.081	0.296**		
Visual Aids	0.037	0.195	0.186	0.264*	-0.252*	0.032	0.296**		
Slides	-0.146	0.069	0.174	0.165	-0.158	0.120	0.159		
Positive Affect	-0.293**	-0.162	-0.227	-0.263*	-0.021	0.338**	-0.106		
Negative Affect	0.268*	0.105	0.121	0.455***	-0.231	$-0.452^{***}$	0.327**		

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Public Speaking Apprehension (PSA), Motivation, and Affect among Accounting Majors

TABLE	2 (	(continued)
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Panel E: Correlations among PS SPSD and Other Variables—Initial Presentation versus Post-Intervention or Final Presentation Dependent Variables (n = 50)

. . . . .

	Initial Presentation									
Post-Intervention or Final Presentation	Appearance	Audience	Structure	Content	Visual Aids	Slides	Positive Affect	Negative Affect		
PRCA—Group	-0.193	-0.139	-0.120	0.141	-0.068	0.034	-0.073	0.241*		
PRCA—Meetings	-0.362 **	-0.223	-0.160	0.040	-0.103	0.097	-0.106	0.212		
PRCA—Interpersonal	-0.073	-0.107	-0.007	-0.020	0.043	0.012	0.095	0.231		
PRCA—PS	$-0.499^{***}$	-0.345 **	-0.150	0.121	$-0.305^{**}$	0.191	-0.260*	0.289**		
PS Motivation	0.403***	0.319**	0.021	0.282**	0.110	0.069	0.329**	-0.269*		
Positive SS	0.363**	0.283**	0.094	-0.070	0.199	-0.101	0.265*	-0.320 **		
Negative SS	-0.239*	-0.143	-0.061	0.072	-0.222	-0.006	-0.083	0.200		
Appearance	0.319**	0.190	0.120	0.136	0.055	-0.059	0.080	-0.041		
Audience	0.106	0.119	-0.018	0.032	-0.017	-0.078	0.219	-0.034		
Structure	0.032	0.148	0.271*	0.031	0.058	0.111	0.177	0.009		
Content	-0.105	-0.037	0.169	0.048	0.008	0.155	0.099	0.098		
Visual Aids	-0.092	0.069	0.210	0.041	0.100	0.188	0.084	0.143		
Slides	0.039	0.108	0.325**	0.066	0.105	0.200	0.143	0.099		
Positive Affect	0.294**	0.198	0.026	-0.032	0.048	-0.024	0.408***	-0.119		
Negative Affect	-0.434***	-0.209	-0.059	0.332**	-0.119	0.391***	-0.180	0.504***		

 $\label{eq:pearson correlations; *, **, ***} \mbox{ significant at } p < .10, \ p < .05, \ \mbox{and} \ p < .01, \ \mbox{respectively (two-tailed)}.$ 

# TABLE 3Pre- to Post-Intervention Differences<sup>a</sup>

#### Panel A: PS Motivation and Positive and Negative Self-Statements (n = 73)

Measure				Repeated Measures ANOVA (F, p values)			
	Timing	Mean	Std. Dev.	Time F(2,69)	Study F(2,69)	Time * Study F(2,69)	
PS Motivation (H1)	Pre-test	11.808	3.554	17.854	0.070	0.205	
	Post-test	13.822	2.756	(0.000)	(0.933)	(0.815)	
Positive Self-	Pre-test	16.164	3.598	8.274	1.016	0.379	
Statements (H2)	Post-test	17.452	3.395	(0.005)	(0.367)	(0.686)	
Negative Self-	Pre-test	5.712	4.427	5.155	0.442	0.395	
Statements (H3)	Post-test	.297	4.001	(0.026)	(0.644)	(0.675)	

#### Panel B: PRCA-24 Measures (n = 50)

#### Repeated Measures ANOVA (F, p values)

Measure	Timing	Mean	Std. Dev.	Time F(1,48)	Study F(1,48)	Time * Study F(1,48)
Meeting (H4)	Pre-test	16.08	4.831	1.638	0.728	0.268
	Post-test	15.16	4.152	(0.207)	(0.398)	(0.607)
Group (H5)	Pre-test	14.36	3.853	1.044	0.315	0.002
	Post-test	13.68	3.793	(0.312)	(0.577)	(0.969)
Interpersonal	Pre-test	14.76	3.868	2.564	0.054	0.013
Communication (H6)	Post-test	13.66	4.064	(0.116)	(0.818)	(0.911)
PS (H7)	Pre-test	19.84	4.648	12.718	5.224	1.240
	Post-test	17.68	4.714	(0.001)	(0.027)	(0.271)

#### Panel C: PANAS Measures (n = 50)

#### **Repeated Measures ANOVA** (F, p values) Time Study Time \* Study Measure Timing<sup>b</sup> Mean Std. Dev. F(1,48) F(1,48) F(1,48) 28.54 0.290 Positive Affect (H8) IP 6.961 6.761 0.000 FP 31.66 8.211 (0.012)(0.984)(0.593)Negative Affect (H9) IP 18.94 7.427 0.001 21.855 2.112 FP 18.24 5.854 (0.000)(0.153)(0.979)

### Panel D: PS Self-Perception Sub-Domain (SPSD) Measures (n = 50)

				Repe	ated Measu (F, p val	ires ANOVA ues <sup>b</sup> )
Measure	Timing <sup>b</sup>	Mean	Std. Dev.	Time F(1,48)	Study F(1,48)	Time * Study F(1,48)
Appearance (H10)	IP	24.287	5.877	18.158	4.795	5.503
	FP	29.62	5.558	(0.000)	(0.033)	(0.023)
Audience (H11)	IP	23.913	4.790	25.516	0.743	1.460
	FP	30.04	5.700	(0.000)	0.393	0.233

(continued on next page)

				Repe	ated Measu (F, p val	ires ANOVA ues <sup>b</sup> )
Measure	Timing <sup>b</sup>	Mean	Std. Dev.	Time F(1,48)	Study F(1,48)	Time * Study F(1,48)
Structure (H12)	IP	7.333	1.750	29.382	0.051	0.020
	FP	8.78	1.266	(0.000)	(0.823)	(0.888)
Slides (H13)	IP FP	7.32 8.48	1.372 1.542	<b>30.677</b> (0.000)	10.356 (0.002)	<b>8.244</b> (0.006)
Visual Aids (H14)	IP	8.34	1.423	2.493	1.393	5.631
	FP	7.633	1.239	(0.121)	(0.244)	(0.022)
Content (H15)	IP	17.42	2.509	48.474	24.662	18.526
	FP	20.46	3.196	(0.000)	(0.000)	(0.000)

#### **TABLE 3 (continued)**

<sup>b</sup> IP = initial presentation; FP = final presentation.

° Two-tailed p-values.

shows no change due to the intervention (p = 0.979), and a main effect due to study (p = 0.027). There is no joint study by intervention effect on negative affect (p = 0.153).

Multivariate GLM indicates that Study 2 negative affect is lower than Study 3 at both pre- (p < 0.000) and post-test (p = 0.002). Surprisingly, Study 2 mean pre-intervention negative affect (1.2) is close to the lowest possible value (1) on this measure, but increases slightly at post-intervention (to 1.4). Hence, the main effect of study on negative affect, and the absence of an intervention effect, may be due to "floor" effects in the Study 2 data.

Our final hypotheses, H10 to H15, predict pre- to post-intervention increases in selfperceived sub-domain (SPSD) PS skills in six specific performance domains. The results are consistent with five of these six hypotheses. Specifically, we observe pre- to postintervention increases in self-perceived skills related to appearance (H10), audience (H11), structure (H12), slides (H13), and content (H15). We observe no significant pre- to postintervention increase in self-perceived skills related to visual aids (H14).

A main effect due to study obtains on three measures: appearance (H10: p = 0.033), slides (H13: p = 0.002), and content (H15: p < 0.000). These main effects are due to lower self-perceived skill in slides and content at pretest in Study 2 (p < 0.000), and lower selfperceived skill in appearance at pretest in Study 3 (p = 0.002). There are no significant post-intervention differences due to study.

The model also indicates a significant study by intervention interaction for four PS SPSD measures. The results of a multivariate GLM of pre-post differences by study indicate that the Study 3 intervention had a larger effect on self-perceived skill related to appearance and visual aids (p  $\leq$  0.023), while the Study 2 intervention had a larger effect on selfperceived skill related to slides and content ( $p \le 0.006$ ). Beyond unsystematic betweenstudy variance, we have no *a priori* or *ex post* theory that would explain these interactions.

#### **Benchmarking Results**

# Self-Statement (SS) Comparisons with Hoffman and DiBartolo (2000) (HD)

Two of our measures, positive SS and negative SS, are from HD. We benchmark our pre- and post-intervention measures against data from their study. HD Studies 1 and 2 are samples of undergraduate college students; we compare weighted average composites (weighted by sample sizes) of the HD Study 1 and 2 data to our results.

Table 4, Panel A, presents means and standard deviations of the HD participants' levels of negative and positive SS. Table 4, Panel B, presents the means and standard deviations for our three studies individually and aggregated; it also reports t-test results comparing our and HD's SS data.

Pre-intervention, our participants' levels of positive SS, individually and in the aggregate, do not differ from HD's (see Table 4, Panel B). At post-intervention, our participants' levels of positive SS are higher in Study 2 and in aggregate, and are marginally higher in Study 1, than are HD's (see Table 4, Panel B). Individually by study and combined, our participants' levels of negative SS are lower at post-intervention than are HD's. In addition, our combined participants' levels of negative SS are lower at pre-intervention than are HD's; this result does not hold when comparing levels of negative SS for our individual studies with HD's. These results provide some support for the assertion that the intervention reduces graduate accounting majors' negative SS and improves graduate accounting majors' positive SS in relation to the HD data.

#### PRCA-24 Comparisons: National Norms and RH

We also compared our PRCA-24 results against two data sets: national norms for U.S. undergraduate students (McCroskey 1982) and the pre- and post-intervention data from

Hofmann and DiBa		CABLE 4marking Re	sults for Nega	ntive Self	f Stateme	ents
Panel A: HD Benchmark	Negative and Posi	tive Self Sta	atement Mean	ns (n = 3	<b>301</b> )	
		Mean				Std. Dev.
Negative SS		7.366				5.267
Positive SS		15.667				4.699
Panel B: Results of our St	tudies 1, 2, and 3	versus HD	1 and 2 <sup>a</sup>			
	Study (n)	Mean	Std. Dev.	df	t-tests	р
Positive Self-Statements	1 (n = 23)	15.739	3.671	322	0.072	0.943
Pre-Intervention	2 (n = 14)	17.214	3.423	313	1.216	0.225
	3 (n = 36)	16.028	3.637	335	0.445	0.657
	All $(n = 73)$	16.164	3.598	372	0.845	0.399
Positive Self-Statements Post-Intervention	1 (n = 23) 2 (n = 14)	17.565 <b>18.429</b>	3.287 <b>2.738</b>	322 <b>313</b>	1.901 <b>2.180</b>	0.058 <b>0.030</b>
Post-Intervention	2 (n = 14) 3 (n = 36)	17.000	2.738 3.680	335	1.642	0.030
	All (n = 73)	17.000 17.452	<b>3.395</b>	333 372	<b>3.057</b>	0.102
Negative Self-Statements	1 (n = 23)	6.043	4.269	322	1.176	0.240
Pre-Intervention	2(n = 14)	5.000	3.211	313	1.665	0.097
	3 (n = 36)	5.778	4.975	335	1.719	0.086
	All $(n = 73)$	5.712	4.427	372	2.478	0.013
Negative Self-Statements	1 (n = 23)	3.957	4.772	322	3.011	0.003
Post-Intervention	2(n = 14)	3.643	2.977	313	2.623	0.009
	3 (n = 36)	4.889	3.838	335	2.735	0.007
	All $(n = 73)$	4.356	4.001	372	2.735	0.001

<sup>a</sup> Significant results shown in **bold**.

RH's (1994) study of OCA among accountancy students. We expect to find no difference between national norms and our pre-intervention data; we expect lower levels of PSA in our post-intervention data than in the national undergraduate norms, but no difference in PSA in our and RH's post-intervention data.

The results are generally consistent with these expectations. Our pre-intervention scores are statistically equivalent to national norms and RH's participants at pre-intervention (results not shown;  $p \ge 0.133$ ). In addition, our participants' post-intervention PSA scores are lower than national U.S. undergraduate norms (McCroskey 1982) (t(12,466) = 3.072, p = 0.002). However, contrary to our expectations, our post-intervention PSA scores are higher than are RH's post-intervention scores (t(70) = 2.25, p = 0.027).

To understand why our post-intervention PSA scores are higher than are RH's post-intervention scores, we separately compared our Study 2 and Study 3 pre- and post-intervention PSA scores with those of RH. The pre- (t(34) = 0.207, p = 0.796) and post-(t(34) = 0.199, p = 0.844) intervention PSA scores of our Study 2 and RH's participants do not differ. However, our Study 3 participants have marginally higher pre-intervention PSA scores (t(56) = 1.815, p = 0.075) and higher post-intervention PSA scores (t(56) = 1.815, p = 0.075) and higher post-intervention PSA scores (t(56) = 2.837, p = 0.006) than do RH's participants. Hence, differences in our and RH's results occur in Study 3 but not Study 2. The post-intervention differences in our Study 3 and RH's study may obtain because of either the: (1) initially marginally higher PSA levels among our Study 3 participants, or (2) because the reduced intervention activity in Study 3 may have reduced intervention effectiveness.

#### PRCA-24 Comparisons: High OCA Base Rates

McCroskey suggests that students who are one standard deviation or above national norms on total PRCA-24 score are "high" OCA. Using this benchmark, RH and SL report approximately 7.5 percent and 19 percent high OCA participants, respectively. In our samples, six students (6/50 or 12 percent) are high OCA at pre-intervention, while three students (3/50 or 6 percent) have high OCA at post-intervention. The SL sample is of introductory accounting classes, while the RH and our sample are of upper division and graduate accounting students, respectively.

#### Do Changes in PS Motivation, and Positive and Negative SS, Correlate with Ability?

RH found that students with higher standardized test scores, i.e., students of higher ability, benefited *less* from their intervention than did students with lower standardized test scores. This suggests that the effectiveness of the RH intervention was greater for students of lower rather than higher ability. We tested whether changes in the PS measures (PS motivation; positive and negative SS) that are common in Studies 1, 2, and 3 correlated with ability (see Table 5). Specifically, we correlated changes in these measures with four measures of ability: (1) overall undergraduate GPA, (2) undergraduate accounting GPA, (3) GMAT total (verbal and quantitative) score, and (4) GMAT analytical writing score.

Only one of the 12 correlations is significant: a *negative* correlation of GMAT total score with the change in negative SS; this result means that students of higher ability (with higher GMAT scores) evidence greater intervention benefits in negative SS compared with students of lower ability. This result is the *opposite* of RH's. We offer three speculative explanations for these differing results: (1) sampling (random) error in one or all of our studies or RH's study, (2) the differing interventions in the present versus RH studies lead to an opposite relationship between intervention efficacy and student ability, and (3) systematic, though unidentified, sample differences in our and RH's studies. These speculations await future investigation.

	Ability Measures						
Change In:	$\frac{\text{GPA}}{(n = 70)}$	Accounting GPA (n = 34)	$\begin{array}{c} \mathbf{GMAT} \\ (\mathbf{n} = 70) \end{array}$	Analytical Writing (n = 28)			
PS Motivation	0.114	.217	.188	-0.057			
Positive SS	0.005	-0.002	-0.086	0.013			
Negative SS	0.004	-0.026	-0.388***	0.061			

TABLE 5								
Studies 1, 2, and 3: Correlations of Changes in Common Dependent Variables with Ability								

significant significance at traditional levels.

### DISCUSSION, LIMITATIONS AND CONCLUSIONS

# **Discussion and Limitations**

Our research design is subject to a number of important limitations. First, our data are subject to a mono-source bias: they include only participants' self-perceptions. We collected external raters' (instructor and independent rater) assessments of student presentations in all studies. Before each study, the raters trained for approximately two hours on practice presentations to increase the validity of their codings. Despite this training, the external rater data are of insufficient reliability to include in the reported results (Cronbach's Alphas  $\sim 0.3$  to 0.4). In addition to their weak intercorrelations, the outside rater data only weakly correlate with students' self-perceptions of their presentations and presentation skills.

The inconsistency of the external rater data with student self-perceptions of presentations reinforces the complexity of addressing the problem of PSA and the development of PS skills. Specifically, research on person perceptions (e.g., Wright and Dawson 1988; DePaulo et al. 1987; Lewicki 1983; Jones 1979) suggests that self-perceptions of PS skills are likely based partially on: (1) emotive and cognitive self-reactions to PS events, (2) selfperceptions of individual traits such as self-esteem, cf., Kenny and DePaulo (1993), and (3) feedback from others on PS performances. Consequently, participants' self-perceptions of PS skill and ability are likely to only weakly correlate with objective measures, and others' assessments, of PS skill and performance. That two of the three information sources that individuals use to assess their PS skills are self-generated from internal affective states is a likely explanation for the: (1) failure of exclusively skill- and knowledge-based interventions, which do not also include emotional and social support, to improving PS skills, (cf., McCroskey et al. 1983), and (2) difficulty of reducing PSA and increasing PS skills.

In order to increase statistical power, our research designs do not include within-study control groups. The absence of an experimental control group increases the possibility of several threats to validity, including history or maturation effects (Shadish et al. 2002). However, we partially address these threats by benchmarking our results against those found in previously published results, and by including measures that we predicted would-H1 through H3, H7 through H15—and would not—H4 through H6—be influenced by the intervention.

Herein, we propose, create, and implement an intervention to improve accounting students' PS skills. However, faculty may lack the skills, interest, time, or institutional support to implement the intervention that we pilot. While this intervention can be copied and implemented at other schools, we acknowledge that many faculty will be unconvinced that the benefits, to them or their students, are sufficient to justify the faculty learning and implementation costs of our proposed intervention. Hence, we acknowledge both individual faculty and institutional limitations on the likely dissemination of the intervention that we demonstrate.

One approach to implementing this or other methods designed to reduce PSA is to partner with faculty, clinicians, or units on campus who have training, skills, and resources related to oral communication or reducing students' learning-related anxiety. Both SL and RH take this approach in their respective efforts to address this issue. Indeed, the creation of the present intervention partially occurred through a partnership of an accounting with: (1) two psychology faculty members who specialize in SDT, and (2) a practicing clinical psychologist who specializes in MI.

Our sample of participants is nonrandom; participants were from one of three MACC program cohorts at one university. That our sample is not randomly selected limits our ability to generalize the results to other participants (e.g., undergraduates), settings (e.g., universities), treatments (e.g., implemented by different instructors), and outcomes (e.g., objective measures of presentation skills). The generalizability of our results will be tested if others implement the proposed intervention with differing participants, in differing settings, with different instructors, and with differing outcome measures.

#### **Summary and Conclusions**

This "proof-of-concept" study is the first of which we are aware to investigate the effects of an SDT- and MI-based intervention to reduce PSA and increase self-perceived PS motivation and skill. Our intervention offers an alternative theoretical foundation and method to that found in previous PS communication and accounting research. The intervention was generally effective in changing students' self-perceptions in three samples; differing implementations in the three studies suggest that changes to reduce faculty effort have, at most, small effects on intervention effectiveness. The intervention description in the attached appendices means that it can be implemented without further development, but rather can be customized to individual faculty and institutional circumstances.

Instructors' teaching styles and preferences differ, as do institutions' willingness and ability to undertake and support alternative curriculum interventions. Accordingly, some instructors or institutions who wish to improve their students' PS skills may choose either our, RH's, or systematic desensitization interventions. One of our contributions is to offer an alternative method for apparently achieving similarly successful outcomes to those observed in RH related to reducing PSA.

Despite these limitations, our results are promising and suggest that supporting feelings of competence and relatedness may reduce accounting students' PSA and increase their PS motivation. The generally positive results suggest that our SDT- and MI-based approach may merit replication and extension, and that SDT-based approaches may hold value to accountancy pedagogy in domains where affective, cognitive, and motivational issues influence success. One such additional application may be in facilitating the development of tacit managerial knowledge (TMK). Tacit managerial knowledge consists of the skills needed to (1) effectively manage one's personal productivity and career, and (2) build working relationships with others. TMK correlates with success among both auditors (Tan and Libby 1997) and manager- and partner-level managerial accountants (Stone et al. 2000). The social interactions that are essential to the development of TMK may produce anxiety among students with high levels of social anxiety. Hence, SDT- and MI-based interventions

may be useful in reducing students' social anxiety and, partially as a consequence, increasing students' TMK. CPA exam preparation also evokes high levels of learning-related anxiety among students. Hence, SDT- and MI-based interventions may also be useful in reducing students' anxiety and enhancing feelings of competence related to CPA exam preparation.

The possibilities for applying SDT and MI principles and methods to the accountancy curriculum offer the opportunity to contribute to both basic and applied research. Our research effort herein has elements of both basic and applied research. Our basic research contribution is conceptualizing, implementing, and delivering a "proof-of-concept" intervention that operationalizes SDT theory and MI principles in a new application (PSA) and setting (accounting instruction). Our applied contribution is to offer the possibility of a new set of techniques and exercises that may be useful to some in combating a major impediment to student success: PSA.

### APPENDIX A

# **Study Constructs and Measures** Panel 1: Common Measures in All Studies: PS Motivation and Self-Statements

# PS Motivation—Three Items (Adapted from Ryan et al. [1999] and Kasser and Ryan [1993])

Everyone has long-term goals and aspirations. These are the things that individuals hope to accomplish over the course of their lives. Next, we want to know how important learning to speak in public is to you. We ask you three questions about this goal: (1) How important is this goal to you? (2) How likely is it that you will attain this goal in your future? (3) How much have you already achieved this goal thus far? Please use the following scale in answering each of the three questions about each life goal: 1 (not at all) to 7 (very). Goal attainment:

- Improving your public speaking skills.
- Feeling relaxed and confident when speaking in public.
- Looking forward to, and enjoying, public speaking.

# Self-Statements during Public Speaking

Please imagine what you have typically felt and thought to yourself during any kind of public speaking situation. Imagining these situations; how much do you agree with the statements given below? Please rate the degree of your agreement on a scale between 0 (if you do not agree at all) to 5 (if you completely agree with the statement):

Positive Self-Statements—Five Items (from Hofmann and DiBartolo 2000):

- What do I have to lose—it's worth a try.
- This is an awkward situation, but I can handle it. •
- Even if things don't go well, it's no catastrophe.
- I can handle everything.
- Instead of worrying, I could concentrate on what I want to say.

Negative Self-Statements—Five Items (from Hofmann and DiBartolo 2000):

- I'm a loser.
- A failure in this situation would be more proof of my incapacity.
- What I say will probably sound stupid.

- I'll probably "bomb out" anyway.
- I feel awkward and dumb; they're bound to notice.

# Panel 2: PS Self-Perception Sub-Domain (SPSD) Measures (Created for this Study)

Please evaluate your final presentation by considering the following aspects of public speaking:

Scale for Study 2 and Study 3 post-intervention assessment: (1) Poor (2) Slightly Below Average (3) Average (4) Slightly Above Average (5) Good.

Scale for Study 3 pre-intervention assessment: (1) Very Poor (2) Poor (3) Slightly Below Average (4) Average (5) Slightly Above Average (6) Good (7) Very Good.

Appearance—Eight Items:

- Maintaining good posture.
- Appearing relaxed and confident.
- Making appropriate gestures with hands and arms.
- Moving with energy and conviction.
- Having an appropriate voice, tone, and inflection (changed pitch, tone, and volume).
- Maintaining positive facial expressions.
- Maintaining eye contact with the entire audience.
- Making the presentation interesting and having a "story" or message.

Audience—Eight Items:

- Recovering from problems or errors without obvious embarrassment or disruption.
- Inspiring action from the audience.
- Answering the question that was asked.
- Providing a knowledgeable, convincing response to questions.
- Having an innovative presentation style or content.
- Appearing confident when responding to questions.
- Positively reinforcing the question-asker (e.g., by making eye contact, repeating the question, saying question-asker's name).
- Having good rapport with audience (i.e., they are interested and engaged).

Structure—Five Items:

- Following the outline.
- Allocating an appropriate amount of time to main points (not too much or too little).
- Stating a presentation objective at the start.
- Making sure that the structure and outline (i.e., main points) of the presentation are clear.
- Making the presentation neither too long nor too short.

Content—Two Items:

- Making sure that the content is relevant based on the topic and outline.
- Making sure that the content is accurate.

Visual Aids—Two Items:

- Using slides that contain an appropriate quantity of information (not too much).
- Using visual aids to enhance and clarify the points made.

Slides—Two Items:

- Using slides that are readable and visually appealing.
- Creating slides that are error-free.

# Panel 3: Personal Report of Communication Apprehension (PRCA-24) (McCroskey 1982)

Please indicate the degree to which each statement applies to you by marking whether you (1) Strongly Agree, (2) Agree, (3) are Undecided, (4) Disagree, or (5) Strongly Disagree. Work quickly; record your first impression.

Group Discussion—Six Items:

- I dislike participating in group discussions. (R)
- Generally, I am comfortable while participating in group discussions.
- I am tense and nervous while participating in group discussions. (R)
- I like to get involved in group discussions.
- Engaging in a group discussion with new people makes me tense and nervous. (R)
- I am calm and relaxed while participating in a group discussion.

Meetings—Six Items:

- Generally, I am nervous when I have to participate in a meeting. (R)
- Usually I am calm and relaxed while participating in a meeting.
- I am very calm and relaxed when I am called upon to express an opinion at a meeting. (R)
- I am afraid to express myself at meetings. (R)
- Communicating at meetings usually makes me feel uncomfortable. (R)
- I am very relaxed when answering questions at a meeting.

Interpersonal Communication—Six Items:

- While participating in a conversation with a new acquaintance, I feel very nervous. (R)
- I have no fear of speaking up in conversations.
- Ordinarily I am very tense and nervous in conversations. (R)
- Ordinarily I am very calm and relaxed in conversations.
- While conversing with a new acquaintance, I feel very relaxed.
- I'm afraid to speak up in conversations. (R)

Public Speaking—Six Items:

- I have no fear of giving a speech.
- Certain parts of my body feel very tense and rigid while I am giving a speech. (R)
- I feel relaxed while giving a speech.
- My thoughts become confused and jumbled when I am giving a speech. (R)
- I face the prospect of giving a speech with confidence.
- While giving a speech, I get so nervous I forget facts I really know. (R)

# Panel 4: Positive and Negative Affect Scale (PANAS) (Watson et al. 1988)

This question consists of words and phrases that describe feelings and emotions. Please read each item and then mark the appropriate answer in the space next to that word. Your answer should indicate the extent to which you feel this emotion or feeling immediately

Negative Affect—Ten Items:

Scared.

Afraid.

Upset.

Jitterv.

Guilty.

Irritable.

Hostile.

Nervous.

Ashamed.

Distressed.

•

before and during public speaking: (1) Not At All (2) A Little (3) Moderately (4) Quite A Bit (5) Very Much.

Positive Affect—Ten Items:

- Enthusiastic.
- Interested.
- Determined.
- Excited.
- Inspired.
- Alert.
- Active.
- Strong.
- Proud.
- Attentive.

Panel 5: Ability

Variable Definition Range **Overall GPA** Cumulative college GPA 0 - 4.0Acct. GPA Average GPA of accounting courses 0 - 4.0**GMAT** Combined score on verbal and mathematical graduate 200-800 management admissions test (GMAT) Analytical Writing Score on analytical writing portion of GMAT 0-6

# **APPENDIX B**

# Training for Development of the Intervention

Preparatory training for the development of the intervention materials began 18 months prior to the first intervention. Self-determination theory and motivational interviewing are closely aligned theoretically and pragmatically (Vansteenkiste and Sheldon 2006; Markland et al. 2005). The development of the intervention materials began with training in a set of core readings in the application of SDT (e.g., Vansteenkiste et al. 2006; Reeve et al. 2004; Ryan and Deci 2000; Levesque et al. 2004) and motivational interviewing (Miller and Rollnick 2002; Rollnick et al. 2008) to educational settings. Following these readings, development of the intervention proceeded with:

- 1. completion of a three-hour introductory motivational interviewing course (on DVD) (Moyers 1998);
- completion of a three-hour course on clinical counseling applications of motivational interviewing (on DVD) (Moyers 1998);
- 3. completion of an eight-hour class with a licensed motivational interviewing instructor that included MI instruction and practice;
- 4. attendance at the 2004 and 2007 self-determination theory research conferences to learn about recent applications of SDT to educational settings; and
- 5. meeting and discussing SDT applications, and co-authoring a research paper (citation withheld to preserve author anonymity), with the co-creators of self-determination theory (i.e., Ed Deci and Rich Ryan).

# APPENDIX C Measure Reliabilities

#### Panel A: PS Motivation and SS

	Study 1	Study 2	Study 3	Combined
PS Motivation	0.842	0.878	0.784	0.795
Positive Self-Statements	0.732	0.714	0.802	0.701
Negative Self-Statements	0.846	0.601	0.878	0.833
Panel B: PRCA-24 Measure Re	liabilities			
PRCA-24 Domain				~
Measures	Study 1	Study 2	Study 3	Combined
Oral Communication App.	NA	0.920	0.935	0.879
Group Discussion	NA	0.851	0.857	0.647
Meetings	NA	0.654	0.906	0.785
Interpersonal Communication	NA	0.861	0.883	0.789
PS	NA	0.892	0.884	0.835
Panel C: Positive and Negative	Affect (PANAS)			
	Study 1	Study 2	Study 3	Combined
Positive Affect	NA	0.929	0.894	0.878
Negative Affect	NA	0.766	0.862	0.850
Panel D: Self-Perceived Sub-Do	main Skill (SPS)	D) Reliabilities		

#### Panel D: Self-Perceived Sub-Domain Skill (SPSD) Reliabilities

Self-Perceived Sub-Domain (SPSD) Skill Measures	Study 1	Study 2	Study 3	Combined
Appearance	NA	0.944	0.889	0.885
Audience	NA	0.903	0.871	0.871
Structure	NA	0.813	0.773	0.804
Content	NA	$0.000^{a}$	0.750	0.669
Visual Aids	NA	0.711	0.458	0.625
Slides	NA	0.514	0.699	0.590

<sup>a</sup> Study 2 pre-intervention and post-intervention reliabilities are 0.733 and 0.743, respectively, for the content construct. We speculate that this result may obtain because participants scoring low on the pre-intervention measure increased significantly on the post-intervention, while those who initially scored high changed only slightly or declined on the post-intervention.

# APPENDIX D

# Study 1: Intervention Description

# Week 1 Intervention: Acknowledging Feelings and Awareness of Self-Statements— The Fear of PS and Pre-Test Measures

Description: The class syllabus included the following statement, which was intended to acknowledge students' fear of public speaking.

**Glossophobia and Contributions to Community Learning (CCL)**. Public speaking, including a willingness to speak in a group, is important to success in accounting and business. Speaking successfully in public includes learning is to think out loud, to think "on one's feet," to ask good questions, and to offer good insights in public. At the same time, fear, i.e., *glossophobia* (there's a new word for you) sets in for most people when they consider public speaking. Glossophobia is the fear of speaking in public.

More about glossophobia:

- Here are a few fun facts about a scary subject: glossophobia (from Wikipedia—the free online encyclopedia):
  - 1. The fear of public speaking ranks higher than the fear of death for most people. Now that's fear!
  - 2. Most people ( $\sim$ 75 percent of those surveyed) suffer from moderate to acute glossophobia.
  - 3. The good news is that, if you want to, you can lessen your fear of public speaking. Here are a few resources (available at: http://www.stop-public-speaking-fear.com /articles/index.htm) for working with glossophobia. In addition, I can help you develop your public speaking skills, and, your confidence in your public speaking skills. I want to help if you want help.

# Week 2 Intervention: Invitation to Work on PS Skills and Readings

Description: Class participants who chose to do so completed a web-based instrument that included a reading on public speaking skills. They were also directed to additional readings which consisted of links at the class on public speaking skill importance to professional accounting, and techniques for improving public speaking skills.

Talking in public can be difficult for some people. In addition, talking in public may not be something that you want to work on at this point in your career. I respect your judgment about what you want to give your attention to this semester. Is feeling more confident about talking in public something that you want to work on this semester? (Note: your response to this question will not affect your grade.) Yes No

Description: Participants responding no (n = 2) were told, "I respect your choice." and thanked for answering this question.

Description: Participants responding yes (n = 21) were:

- asked, "Would you like to read a short article, and answer a couple of quick questions, about how to become a more confident public speaker now?" if they would like to read a short article.
- participants responding yes read a short article on public speaking and answered some questions about how this reading was, or was not, relevant to their experience in public speaking.
  - i. What did you think of the article? The article mentions "Eleven Hidden Causes of Public Speaking Stress." These are: (1) Thinking that public speaking is inherently stressful (it's not). (2) Thinking you need to be brilliant or perfect to succeed (you don't). (3) Trying to impart too much information or cover too many points in a short presentation. (4) Having the wrong purpose in mind (to get rather than to give/contribute). (5) Trying to please everyone (this is unrealistic). (6) Trying to emulate other speakers (very difficult) rather than simply being yourself (very easy). (7) Failing to be personally revealing and humble. (8) Being fearful of potential negative outcomes (they almost never occur, and even when they do, you can use them to your advantage). (9) Trying to control the wrong things (e.g., the behavior of your audience). (10) Spending too much time over-preparing (instead of developing confidence and trust in your natural ability to succeed). (11) Thinking your audience will be as critical of your performance as you might be. Do any of these seem true in your experience of public speaking?
  - ii. The article also mentions "10 Key Principles to Always Keep in Mind" These are: (1) Speaking in Public is NOT Inherently Stressful. (2) You Don't Have to be

Brilliant or Perfect to Succeed. (3) All You Need is Two or Three Main Points. (4) You also Need a Purpose That is Right for the Task. (5) The Best Way to Succeed is NOT to Consider Yourself a Public Speaker! (6) Humility and Humor Can Go a Long Way. (7) When You Speak in Public, Nothing "Bad" Can Ever Happen! (8) You Don't Have to Control the Behavior of Your Audience. (9) In General, the More You Prepare, the Worse You Will Do. (10) Your Audience Truly Wants You to Succeed. Do any of these seem like they might be helpful to you? If so, which ones? Why might they be helpful?

• directed to the class website links on public speaking.

Description: The class website also included links, which the instructor mentioned in class, to presentation resources (e.g., Harvard Business School Tips on Preparing Slides, available at: http://www.hsph.harvard.edu/administrative-offices/faculty-affairs/files/visual\_aids. pdf).

# Week 3 Intervention: Individualized Email that Reflects Feelings Back to, and Increases Awareness of, Self-Statements

Example correspondence with student:

Hi <student's first name>,

I hope that you are doing well. Tomorrow is the first presentation day in <this class>. I wanted to respond to your comments on the first contribution to class learning (CCL) report that you submitted.

You mentioned that you worried about "messing up" when public speaking, including fears that you might get sick or not be able to answer a question. You mentioned that you don't think of yourself as being good at "thinking on your feet." You also said that it might be helpful to remind yourself that your audience (and your class instructor!) want to see you succeed.

Is that an accurate summary? Does that cover what you are thinking about this issue?

I hope that this summary is helpful to you. I appreciate and respect the attention that you are devoting to thinking about this important issue.

Best,

<class instructor>

# Week 4 Intervention: Presentations

Participants, organized into groups, made presentations about selected (assigned) portions of the Sarbanes-Oxley legislation.

# Week 5 Intervention: Feedback on PS Skills

Participants received a grade and summary evaluation of their Week 4 presentations from the course instructor. In addition, participants who requested it (n = 21) received individual feedback about 25 aspects of their presentations. Feedback was provided on the following dimensions:

- 1. Includes an introduction that motivates interest in the topic or issue.
- 2. Structure and outline (i.e., main points) of the presentation are clear.
- 3. Uses examples (i.e., evidence) to illustrate important points.
- 4. Presenter demonstrates innovation in presentation style or content.

- 5. Presentation is interesting and contains a "story" or message.
- 6. Voice, tone, and inflection (changed pitch, tone, and volume).
- 7. Avoids fillers (e.g., "um," "er," "you know," etc.).
- 8. Uses appropriate humor.
- 9. Appears relaxed and confident.
- 10. Maintains eye contact with audience.
- 11. Maintains positive facial expressions.
- 12. Gestured with hands and arms.
- 13. Maintained good posture.
- 14. Moves with energy and conviction.
- 15. Followed the outline.
- 16. Has good rapport with audience.
- 17. Uses notes (if any) appropriately.
- 18. Confident in responding to questions.
- 19. Repeated or restated question to clarify.
- 20. Provides knowledgeable response to questions.
- 21. Visual aids enhance and clarify the points made.
- 22. Slides contain appropriate quantity of information (not too much).
- 23. Slides are readable and visually appealing.
- 24. Used media to review main points.
- 25. Summarizes no more than three key points.

# Week 8 Intervention: Project Meetings, Coaching, and Awareness of Self-Statements

Participants met with the instructor regarding the semester projects. These meetings included, if desired by the participants, a discussion of oral presentations and, for some students, a brief, spontaneous presentation. Following each presentation, the instructor of-fered comments and suggestions that were based in dialogue principles and methods from motivational interviewing and self-determination theory.

# Week 16 Intervention: Final Presentations and Post-Test Measures

Participants made presentations on a topic of their choice in the same groups as the presentations in Week 4. All participants received a grade and summary evaluation of their Week 4 presentations. After the presentations but before receipt of their grade, participants completed the post-test measures.

# **APPENDIX E**

# Study 2 and Study 3 Intervention Differences from Study 1 Week 1: Additional Measures

*Both studies:* In addition to Study 1 description and measures, assessed new PRCA-24 measures.

# Week 3 Intervention: Email that Reflects Feelings Back to Student

Both studies: Omitted due to time required of instructor (~15 minutes per student).

# Week 4 Intervention: Presentations

Study 2 only: In addition to Study 1 description, videotaped student presentations and assessed PS self-perceived sub-domain skill and PANAS measures following presentations.

### Week 5 Intervention: Feedback on PS Skills

*Study 2 only:* In addition to Study 1 description, reviewed videotaped student presentations. Instructor discussed students' presentation problems and strengths within groups.

### Week 16 Measures: Presentations

*Both studies:* Assessed PS self-perceived sub-domain, PRCA-24, and PANAS measures following presentations.

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