

**Pluralistic Ignorance Within Academic Self-Efficacy and Its Relationship With Academic
Performance**

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Abstract

Pluralistic ignorance (PI) is a phenomenon where people incorrectly estimate the strength and/or direction of the majority's attitudes (Miller & Prentice, 1994). The current study investigates the presence of PI within academic self-efficacy (ASE) among college freshmen to see whether students tend to overestimate their peers' ASE. Associations between PI within ASE and college freshmen's academic performance, and whether this relationship is mediated by academic behaviors, academic adjustment, and institutional attachment are also tested. A total of 101 college freshmen from introductory psychology classes completed survey measures during the first 5 weeks of their first semester in college, and 44 of them completed time two survey measures during the last four weeks of their first semester. Contrary to the hypotheses, results indicated that on average participants significantly underestimated their peers' ASE instead of overestimating. Underestimation of peers' ASE is also associated with higher academic performance at the end of the semester. However, the relationship between PI within ASE and academic performance is not significantly mediated by academic behaviors, academic adjustment, or institutional attachment. The current study provided initial evidence for the presence of PI in academic settings, which in turn affects students' academic performance. Implications of the results and suggestions for future research are discussed.

Keywords: Pluralistic ignorance, Academic self-efficacy, College freshmen, College adaptation, Academic performance

Table of Contents

Title Page.....	1
Abstract.....	2
Table of Contents.....	3
Statement of the Problem.....	6
Chapter 1: Introduction.....	7
Academic Self-Efficacy and Academic Performance.....	8
Pluralistic Ignorance.....	11
Pluralistic Ignorance and Academics.....	18
The Current Study.....	19
Chapter 2: Method.....	21
Participants.....	21
Material.....	21
Academic Self-Efficacy.....	21
Academic Self-Efficacy Scale (ASES).....	22
Self-Efficacy for Learning and Achievement Subscale (SELAS).....	22
Supplemental Author-Constructed Measure.....	23
Social Desirability.....	23
Academic Procrastination Scale – Short Form (APS-S).....	24
Student Adaptation to College Questionnaire (SACQ).....	24
Academic Behaviors.....	25
Academic Outcomes.....	25
Procedure.....	26
Statistical Analyses Plan.....	28
Data Screening.....	28
Descriptive Analyses.....	28
Data Reduction.....	28
Demographic Analyses.....	29
Test of Hypothesis One.....	29
Test of Hypothesis Two.....	29
Test of Hypothesis Three.....	30
Test of Hypothesis Four.....	31
Chapter 3: Results.....	32
Data Screening.....	32

Data Reduction Analyses	33
Descriptive Analyses.....	34
Demographic Analyses	35
Main Analyses.....	37
Hypothesis One.....	37
Hypothesis Two.....	38
Hypothesis Three.....	40
Hypothesis Four.....	41
Supplementary Analyses	42
Chapter 4: Discussion	44
Strength and Limitation.....	49
Implications.....	52
Future Directions.....	54
References.....	56
Appendix A: Academic Self-Efficacy Scale-Self.....	63
Appendix B: Academic Self-Efficacy Scale-Other	64
Appendix C: Self-Efficacy for Learning and Achievement Subscale-Self	65
Appendix D: Self-Efficacy for Learning and Achievement Subscale-Other.....	66
Appendix E: Supplemental Author-Constructed Measure-Self.....	67
Appendix F: Supplemental Author-Constructed Measure-Other	68
Appendix G: Marlow-Crowne Social Desirability Scale.....	70
Appendix H: Academic Procrastination Scale-Short Form-Self	71
Appendix I: Academic Procrastination Scale-Short Form-Other	72
Appendix J: Student Adaptation to College Questionnaire	73
Appendix K: Academic Behaviors	76
Appendix L: Consent Form	77
Appendix M: Codename Instructions	79
Appendix N: Demographic Questions.....	80
Appendix O: End of Survey Message (Time One).....	82
Appendix P: End of Survey Message (Time Two).....	83
Appendix Q: Figures.....	85
Figure 1: Mediation of Academic Behaviors Between PI Within ASE and Academic Performance.	85
Figure 2: Mediation of Student Adaptation Between PI Within ASE and Academic Performance	86

Figure 3: 2 x 2 Mixed Model ANOVA for Combined ASE Time One.....	87
Appendix R: Tables	88
Table 1: Principal Component Analysis for Combined ASE Time One.....	88
Table 2: Principal Component Analysis for Combined ASE Time Two.....	89
Table 3: Bivariate Correlations	90
Table 4: Association Between Mother Education and Main Variables of Interest.....	92
Table 5: The Effects of Target and Time on SELAS.....	93
Table 6: The Effects of Target and Time on Combined ASE.....	94
Table 7: The Effects of Target and Social Desirability on SELAS and Combined ASE Time One	95
Table 8: The Effects of Target and Social Desirability on SELAS and Combined ASE Time Two.....	96

Statement of the Problem

The present study investigates whether college first-year freshmen on average tend to overestimate other college students' academic self-efficacy, and how overestimation can lead to potential consequences on students' academic performance. Previous studies suggest that students tend to underestimate other students' number of hours of study, and this underestimation was associated with better grades on exams (Buzinski et al., 2018). It is imperative for the current research to extend beyond actual study behaviors to students' perceived academic-related abilities of others. The current study also provides evidence for whether students' adaptation to college and their study behaviors mediate the relationship between misestimation of academic self-efficacy and academic performance.

Chapter 1

Pluralistic Ignorance Within Academic Self-Efficacy and Its Relationship With Academic Performance

Factors that improve academic outcomes are widely studied. While many studies look at internal factors that contribute to students' success, such as beliefs about achievement abilities (Honicke & Broadbent, 2016), other studies look at how one's perception of their social environment can affect their academic outcomes (e.g., Buzinski et al., 2018). Buzinski et al. (2018) suggested that students' perceptions of other students' study behaviors can affect their own exam outcomes. For instance, if students believe others study more hours per week than themselves, students tend to score lower on their exams. More importantly, the finding that students overestimated other students' average study hours can be attributed to the phenomenon of pluralistic ignorance, which is a tendency to misestimate other peoples' attitudes and therefore misestimate social norms. Pluralistic ignorance is a phenomenon that 90 years of research suggests occurs in many aspects of daily life (Allport, 1924).

The current study tests the presence of pluralistic ignorance within college students' perceptions of their peers' academic self-efficacy (ASE). ASE is the belief in one's ability to persevere through obstacles in academic settings and eventually succeed in class. The present study adds to the literature on pluralistic ignorance within academic performance by investigating the impact of pluralistic ignorance within ASE on one's academic behaviors and academic performance among college freshmen in their first semester. The present study will also extend understanding of what contributes to students' academic success beyond characteristics that lie completely within themselves and into factors that are associated with the

social cognitions about the academic environment. The current study also investigates the effect of pluralistic ignorance within ASE on students' adaptation to college life.

Academic Self-Efficacy and Academic Performance

Before the introduction of ASE, self-efficacy (SE, also referred to as general self-efficacy) was proposed as an essential component of the social cognition theory developed by Albert Bandura (Bandura, 1997; Honicke & Broadbent, 2016). SE represents peoples' general beliefs about their ability to use appropriate resources available to accomplish tasks, especially those often considered challenging and taxing (Honicke & Broadbent, 2016). SE is, therefore, heavily studied in areas of self-control, including smoking, diet control, and addiction relapse (Conner & Norman, 1995, as cited in Honicke & Broadbent, 2016; Povey et al., 2000).

While SE does involve one's expectations of the eventual outcome produced by the corresponding behaviors, Bandura (1977) argued expectation itself does not predict the initiation or the duration of the corresponding behaviors. That is, one can be aware that certain behaviors (sometimes difficult behaviors) can lead to a desired outcome, but that awareness does not necessarily lead to action because it is hard to stay focused for long periods of time. It is undoubtedly crucial for people to know what to do in order to solve problems. Still, it is more important for people to initiate their problem-solving behaviors. Therefore, SE is important because it predicts how successful one will be at persisting on difficult tasks and overcoming difficult obstacles, which are essential in many kinds of life domains, including academic performance in college.

The few key dimensions within SE expectations identified by Bandura (1977) are magnitude, strength, and generality. Magnitude represents the degree of task difficulty people view as achievable in their SE expectations. When tasks are ordered according to their difficulty

levels, some individuals only view simple tasks as achievable, while others might view moderate or even the most difficult tasks as achievable. Strength represents how easily one's SE can be modified. Weak SE beliefs can be easily modified by new inconsistent experiences (i.e., success will increase the magnitude of the SE beliefs, and failure will decrease the magnitude of the SE beliefs), whereas strong SE beliefs are more resistant to change. Generality represents the degree to which SE gained through experiences within a specific context can also be generalized to other contexts. It is possible that SE within one context may not generalize to different contexts. Taking these three dimensions into account, it is almost impossible to use one universal score to accurately represent an individual's SE in every domain. Rather, researchers have developed measures of SE for specific domains of performance. For example, to better predict and learn about students' academic potential in college, researchers developed the ASE scale to represent people's beliefs about their ability to overcome academic-related obstacles, such as earning good grades in high-level classes (Elias & MacDonald, 2007).

Numerous studies identify positive associations between ASE and students' academic performance (Adeyemo, 2007; Afari et al., 2012; De Clercq et al., 2013; De Feyter et al., 2012; Fang, 2014). Meta-analyses conducted by Honicke and Broadbent (2016) suggested a moderate positive correlation between ASE and students' grades in general. However, the magnitude of the association between ASE and grades differs from study to study due to differences in the measurement of ASE and operational definitions of academic performance (e.g., self-reported GPA vs. official GPA obtained from school or overall GPA vs. performance in a specific course). Mechanisms behind the positive correlation between ASE and academic performance are usually explained by the higher likelihood of people with high ASE using and choosing the

appropriate study strategies for different challenges (Honicke & Broadbent, 2016; Mega et al., 2014).

However, the strength of the correlation between ASE and academic performance is affected by several key factors (Honicke & Broadbent, 2016), including how specific the assessment is and the timing of assessment. The specificity of an ASE measure matters. For example, ASE measurement can be divided into two main categories: general ASE measurement and specific ASE measurement (McIlroy et al., 2000; Pintrich et al., 1993). Honicke and Broadbent (2016) suggested that even though the general ASE correlates with students' overall GPA fairly well, they might be less effective in predicting students' grades in a specific class, whereas specific ASE measures may be more accurate than general ASE measures at predicting grades in a specific area of study (e.g., STEM courses vs. humanities courses). In addition to the specificity of ASE measures, Honicke and Broadbent (2016) attributed some of the non-significant correlation between ASE and performance to the timing of the assessment (Neuville et al., 2007; Phan, 2010). They believe assessing the ASE too early during a semester can attenuate the strength of correlation, whereas assessing it around the middle of the semester generally provides the strongest correlation due to the reason that students will not have the time to adjust their expectations based on their performance given very little time at the beginning of the semester and very little feedback from their performance (Galyon et al., 2012; Honicke & Broadbent, 2016).

The current study investigates the relationship between ASE and academic performance from a different perspective. It is clear that ASE is moderately correlated with academic performance (Honicke & Broadbent, 2016). Yet, the perception students have of their peers' and classmates' ASE, the relative standing of those beliefs with respect to their own ASE, and the

effect these beliefs may have on academic performance has not been investigated. It is possible that students' own behaviors can be influenced by the presence and behaviors of other students through the mechanism of conformity (Asch, 1956). Plus, people often incorrectly estimate group norms, a phenomenon known as pluralistic ignorance (Miller & Prentice, 1994).

Pluralistic Ignorance

Pluralistic ignorance (PI) occurs when most or all of the members of a group misperceive the strength and/or direction of opinions or attitudes of others within the group (Miller & Prentice, 1994). This misperception of the group's norm is thought to be caused by the misinterpretation of the public behaviors of other group members; the behaviors of group members who are conforming to the false norm to avoid negative judgments are misinterpreted as support for the norm (Allport, 1924), which further reinforces one's perception of the false group norm. Consequences of PI, such as cognitive dissonance caused by this mismatch, may create pressure to "adjust" our attitudes and move them closer to the subjectively perceived false norm (Miller & Prentice, 1994).

PI evolved from Floyd H. Allport's (1924) earlier work on the "Illusion of Universality," which is the tendency for people to overestimate the unanimity of their group members' attitudes when they are given limited objective cues about the true group attitudes. More specifically, when there is incomplete information about how other group members think, individuals often apply what they believe to be true of some group members to infer what everyone else in the group is thinking. PI is one kind of illusion of universality, in which individuals mistakenly assume the group norm is different from their own personal belief, and that the rest of the group is unanimous in its support for that norm.

It was not until 1931 that the term PI was coined, and empirical evidence was collected to support the presence of PI (Katz & Allport, 1931). Katz and Allport (1931) conducted a survey of college students' attitudes about a broad range of topics, including attitudes toward cheating and prejudice toward different racial/social groups, such as working-class students, protestants, and African Americans. With respect to prejudice, Katz and Alport (1931) asked participants about their level of willingness to let different racial/social group members into their fraternity. About 55% of the fraternity members indicated they have no personal objection to the entrance of those groups into their fraternity. Still, they were afraid that admitting people from certain groups might negatively affect their groups' reputation. Another 14% of members indicated they had no personal objections, but they were afraid other members might be concerned about letting those groups in. Ironically, those two types of answers made up the majority of the fraternity's members. As stated by Katz and Allport (1931), "(i)f a majority of fraternity members have no personal objection to these types of individuals, why should the individual fraternity member fear student opinion?" (p. 152). This mismatch between perceived public attitudes and true public attitudes indicates one of the first documentations of PI.

Besides prejudice toward minority groups, Katz and Allport (1931) also found evidence of PI in students' attitudes toward cheating in academic work. Students reported whether they had cheated on their tests before (which represents true public attitudes) and how many other students they think have cheated (which represents the perceived public attitudes). About two-thirds of the students admitted they had cheated. However, only 19% of students accurately estimated this number, whereas 15% overestimated the number, and about 66% underestimated the number. This finding serves as another piece of evidence to support PI in the early 20th century.

While Allport and Katz (1931) were conducting their research, another student of Allport, Richard Schanck, went to a small town in up-state New York and studied public and private attitudes of people. Notably, the predominantly Christian community had established prohibitions against card playing (Schanck, 1932). Schanck interviewed community members about a number of attitudes including card playing and the prohibition of alcohol to assess 1) their private attitudes, 2) public attitudes they held in front of others (who were also members of the same church as them), and 3) perceptions of the attitudes community members thought their neighbors held. Surprisingly, under private conditions, the majority of the town folks reported that they play cards (with and without gambling), whereas under public conditions, the vast majority claimed they restrict their card play. More importantly, people also had incorrect perceptions of their neighbors' opinions. Most of the participants claimed they do play cards, while most people thought the majority of their neighbors restricted their card playing.

Despite these successful demonstrations of PI, the concept of PI remained silent in the field for another 30 years. It was not until the civil rights movement that the concept of PI was again studied within the attitudes about desegregation held by native residents of a southern city (Breed & Ktsanes, 1961; O'Gorman, 1986). PI was demonstrated in that most people saw others as more opposed to desegregation than themselves. After this, PI was studied intermittently throughout the 60s and 70s. It was not until the later 1980s and early 90s that significant and thorough reviews on PI were presented by Miller and McFarland (1987) and Miller and Prentice (1994). A very significant finding of PI was found in Prentice and Miller's (1993) study on college drinking behaviors. In addition to demonstrating that students overestimated their peers' comfort with campus drinking norms, Prentice and Miller (1993) investigated the consequences of this misestimation of drinking norms. For example, males were more likely to internalize the

drinking norm over time, whereas females did not. They also found greater PI may lead to feelings of alienation and dissociating oneself from the group.

In the first comprehensive theoretical review of PI, Miller and Prentice (1994) describe different types of PI that vary based on the source of false norms and identify three possible situations where PI might occur: minority enforced public norms, prototypical social norms, and conservative lag. In addition to these three relatively longer-term types, there is a fourth that is relatively short-term and may be best labeled as situational ambiguity.

Starting with the short-term form, PI resulting from situational ambiguity occurs in situations that are new, when multiple norms compete, or in emergencies or crises where existing norms break down. In such situations, people turn to others to help define the situation for them, even though others may not understand the situation any better than they do. When a person looks to others to define the situation, it can lead to paralysis and inaction. An example of this is the bystander situation (Darley & Latane, 1968). When no one knows clearly whether the situation represents an emergency, people may behave with calmness, which might further become a signal to others that this is not an emergency warranting action. This type of PI is considered short-term because the PI resulting from many characteristics of the situation will disappear as soon as individuals leave that particular situation.

Moving into the long-term forms of PI, misestimation of social norms resulting from a minority-enforced public norm occurs when a few influential individuals in a group have a disproportional influence on other group members' perceptions of the group norm (Miller & Prentice, 1994). Those influential and visible individuals disproportionately serve as representations of the majority and have greater influence on perceptions of group norms than others, less-vocal group members. An example of this can be found in Shanck's (1932) Elm

Hollow study, in which a small group of vocal and influential religious leaders within the town set up rules or prohibitions on card-playing and alcohol drinking and encouraged the larger Christian community to express public opinions about playing cards that did not match their private opinions.

PI resulting from prototypical or idealized group norms assumes that some characteristics that a group holds as central to its identity may not actually be supported by a majority of the group members (Miller & Prentice, 1932). Despite the lack of true support from group members, the group's beliefs about itself can influence group members' behaviors. An example of this is Prentice and Miller's (1993) investigation of PI for college drinking norms. The authors postulate that PI arises in part because college students have stereotypes about the role that alcohol plays in college life.

PI resulting from conservative lag occurs when individual group members' beliefs are changing faster than the beliefs they think the rest of the group hold. Group members mistakenly assume this change in beliefs is not shared by others in the group (Miller & Prentice, 1994). This misperception will be encouraged when there are not enough cues from the behavior of others to prompt a corresponding shift within individual group members' beliefs about other group members' attitudes. This is very likely to happen, especially when the new belief is viewed as incompatible with old beliefs. In that case, people who hold the new belief are less likely to express the new belief publicly for fear that it will be considered inappropriate by the larger group. One example of conservative lag is the civil rights movement (Breed & Ktsanes, 1961). The idea of integration had long existed in people's minds before the movement (Miller & Prentice, 1994). Yet, most people were unsure if others would also hold the same new belief. Therefore, the majority norm was not changed until the movement.

Researchers so far have identified several phenomena that underlie PI, including the false norm, normative social influence, misattribution of group members' behaviors, the illusion of universality, and false uniqueness/false deviance (Allport, 1929; Prentice & Miller, 1994). A false norm is typically demonstrated when the average of the ratings that group members make for their own attitudes (the true norm) are significantly different from the average of the estimate individuals make for others (the perceived norm). A few studies have also demonstrated PI by comparing statements made publicly and privately (e.g., Schanck, 1934; Strosser et al., 2016). Normative social influence is a change in behavior (conformity) to prevent the negative judgment of others or to acquire rewards. Within PI, individuals are thought to conform to a norm they have incorrectly perceived. Few empirical studies have directly assessed conformity behavior resulting from PI. Miller and McFarland (1987) put participants in the same classroom and gave them difficult articles to read. Researchers then left the room and told participants to come to their office to ask questions if they had any about the article. The article was designed to be difficult to read without professional knowledge. Yet, none of the participants left the classroom to ask the researchers questions. It was suggested that participants all followed the norm in the room that no one should leave to ask questions.

Misattribution of behaviors is the incorrect judgment of the true motive behind other group members' conformity to the false norm (Miller & McFarland, 1987, 1991). People can make two types of attributions to others' behaviors. They can either make the external attribution that others' behaviors are the result of situational influences, or they can make the internal attribution that others' behaviors reflect their true personal thoughts and intentions. However, there is a tendency for people to make internal attributions instead of external attributions in most situations, including PI. Within the cases of PI, people tend to make internal attributions

and assume others' behaviors to reflect their true intentions, despite the fact that group members are really conforming to perceived group expectations in order to be part of the group. This misattribution for others' motives further reinforces the perception of false norm.

The illusion of universality is a phenomenon where people tend to use information they gain from a limited number of group members to draw inferences about the majority's attitudes and behaviors. Often, people only have direct access to a small sample of individuals within the larger group around them, and individuals must use information from this smaller group to make inferences about other members of the larger group who cannot be directly observed. When the assumptions are incorrect, then the assumption of the group's unanimity becomes an illusion of universality. The illusion of universality promotes the perception of false group norms. The illusion of universality is often assessed by comparing the standard deviation of self-ratings and other-ratings. If the standard deviations of other-ratings are significantly lower than the standard deviation of self-ratings, then researchers often interpret this as evidence for the presence of the illusion of universality.

Finally, false uniqueness, or false deviance, is the failure to generalize our own feelings to other group members (Miller & Prentice, 1994). It is more likely for group members to assume they are alone in their rejection of the group norm. Feelings such as the fear of being judged negatively might be treated as personal feelings that are not shared by others. False uniqueness, in theory, is thought to have a bidirectional influence on other mechanisms underlying PI, including false norms, conformity, misattribution of conformity behavior, and the illusion of universality.

Pluralistic Ignorance and Academics

Previous investigations of PI within academic-related subjects have focused on topics such as cheating behavior (Halbesleben et al., 2004; Henningsen & Henningsen, 2020; Katz & Allport, 1931) and average study time for tests (Buzinski et al., 2018). About 90 years ago, Katz and Allport (1931) found college students were more likely to underestimate the rate of cheating among their peers. University students reported that they cheated significantly more often on exams and class assignments than they believed their peers did. Today, researchers find students are more likely to significantly overestimate the rate of cheating behaviors on tests (Halbesleben et al., 2004; Henningsen & Henningsen, 2020). Henningsen and Henningsen (2020) found that some participants perceived their classmates to be five times more likely to cheat than the participants themselves.

Buzinski et al. (2018) found college students also tend to significantly overestimate the number of hours per week that their classmates study, representing a pattern of PI. Magnitudes of PI were also estimated by subtracting the true norm (represented by average of self-ratings) from each participant's estimation of their peers' weekly study time. Magnitude of PI was negatively associated with exam performance.

In other words, students who overestimated their peers' study time (in relation to the actual average time spent studying by students) were more likely to receive lower exam scores, even though their own study time was positively correlated with their estimation of their peers' study behavior. The researchers also tested whether perceived lack of preparedness mediated the relationship between magnitude of PI and exam performance. Magnitude of PI was positively associated with feeling unprepared. Further, feeling unprepared was negatively associated with exam scores. The relationship between PI and exam scores was significantly mediated by the

perceived lack of preparedness. Though the exact mechanism is unclear, feeling unprepared may represent a negative mental state that increases students' stress during the exam and thus interferes with exam performance. Alternatively, feeling unprepared might also reduce students' motivation to try hard on the test, which also results in poorer exam performance.

The Current Study

The current study investigates the possible presence of PI within ASE. This represents a novel area of research; no previous studies have directly examined PI within ASE. The current study expands on Buzinski et al. (2018), which investigated PI within academic-related variables (average study time) and the relationship between PI and academic performance. In the present study, ASE was chosen because it is positively and moderately correlated with academic performance, and having faulty perceptions about the academic competence of one's peers may have consequences for the effort that students direct to their academic work. The current study is a correlational and within-subjects design, and it utilizes an online survey format. Data were collected from participants twice throughout the semester: once during the first five weeks of the semester and once within the last six weeks of the semester. The present study assesses students' perception of ASE for self and other, their academic expectations, their perception of procrastination level for self and other, social desirability, and demographics at the beginning of the semester. Students were asked to return to the survey during Time Two and answer questions regarding college adjustment, perceived ASE for self and other, perceived procrastination for self and other, and a range of academic behaviors such as average study hours weekly, number of times they have been to office hours, class participation, etc. Students' first semester GPA, persistence to spring (i.e., not dropping out) as well as the letter grade and percentage of total

points possible earned in their introductory psychology course were collected after the close of the semester. The present study proposed the following four hypotheses:

1. Students' average self-reported ASE will be significantly lower than students' perceptions of the ASE of their peers, which is consistent with a pattern of pluralistic ignorance.
2. The magnitude of PI (difference scores created by subtracting perceived other-score from the true average, the average of the self-scores) will be negatively correlated with participants' final grades. In other words, students who overestimate their peers' level of ASE will get lower final grades.
3. The presence of fewer positive academic behaviors will mediate the relationship between magnitude of PI and final grades. It is expected that students who think their peers are higher in ASE than themselves may also feel discouraged and demoralized, which will then lead to engaging in fewer positive academic behaviors and more negative behaviors, because motivation to persevere through the obstacles has been deteriorated. Additionally, the reduction in positive academic behaviors and increase in negative behaviors will be associated with reduced academic performance. The inclusion of academic behaviors in the prediction of academic performance is expected to reduce the influence that the magnitude of PI has upon academic performance.
4. Participants who experience greater PI may also have more difficulty adapting to college, potentially due to feelings of alienation from the group. Because of this alienation, students with greater PI are expected to have lower levels of academic adjustment and institutional attachment. Lower academic adjustment and lower

institutional attachment are also expected to be associated with lower grades. The inclusion of academic adjustment or institutional attachment in the prediction of academic performance is expected to reduce the influence of PI on academic performance.

Chapter 2

Method

Participants

The current study recruited 146 participants from Radford University undergraduate freshmen enrolled in introductory psychology classes, who were first-time college students in their first semester of college. Participants ranged from 17 to 33 in age ($M = 18.46$, $SD = 1.59$). Participants received credits that fulfill their course requirements by participating in the study. The majority of the participants (70.5%) identified as White, 8.9% identified as Black, 2.1% identified as Asian, and 18.5% identified as multi-ethnic or another ethnicity. As for gender, 67.8% of the participants identified as female, 26.7% identified as male, and 5.5% preferred not to answer or identified with additional genders. Other demographic information regarding age, relationship status, educational status of parents and siblings, growing up living environment, and highest household income during grow up were also collected.

Material

Academic Self-Efficacy

Three measures of academic self-efficacy (ASE) were utilized in the present study: 1) The Academic Self-Efficacy Scale (ASES; McIlroy et al., 2011), which measures general beliefs about ASE; 2) the Self-Efficacy for Learning and Achievement Subscale (SELAS) of the Motivated Strategies for Learning Questionnaire (Pintrich et al., 1993), which measures ASE

within the context of a specific college class; and 3) a supplemental author-constructed measure, which consists of items adapted from other measures of ASE that assessed academic domains that the ASES and the SELAS did not assess. Two versions of each were presented to participants: a self-version and an other-version. In the self-version, participants reported their perception of their own ASE. In the other-version, participants reported their perceptions of their peers' (the average Radford University students') ASE.

Academic Self-Efficacy Scale (ASES)

The ASES (McIlroy et al., 2011) measures general beliefs about ASE and was modified with minor language changes to better suit American participants. More specifically, the term "end-of-semester-exams" was switched to "tests." The resulting scale consists of 10 items (see Appendix A for the Self version of the ASES and Appendix B for the Other version), which are rated on a 7-point numerical scale, ranging from 1 (strongly disagree) to 7 (strongly agree). An example item reads, "I am confident that I can achieve good exam results if I really put my mind to it." Responses were averaged to create an overall score that represents one's ASE, where a higher score implies a higher level of ASE. Based on the original study, this scale achieved strong internal consistency with a Cronbach's alpha of .87 (McIlroy et al., 2011).

Self-Efficacy for Learning and Achievement Subscale (SELAS)

The SELAS (Pintrich et al., 1991) measures a student's ASE within a specific course. In the current study, the SELAS measures students' ASE within introductory psychology. The scale consists of eight items (see Appendix C for the Self version of the SELAS and Appendix D for the Other version) rated on a 7-point numerical scale, ranging from 1 (strongly disagree) to 7 (strongly agree). An example item reads, "I'm confident I can understand the basic concepts taught in this course." Responses were averaged to create a final score that represents one's ASE

within introductory psychology. A higher score implies a higher level of ASE in the course. Based on past studies that have used this scale, this scale achieved exceptional internal consistency with a Cronbach's alpha of .93 (Honicke & Broadbent, 2016).

Supplemental Author-Constructed Measure

An author-constructed, supplemental measure of ASE assessed aspects related to General ASE that are not covered in ASES (McIlroy et al., 2011). The measure evaluates belief about one's ability to do well in multiple domains of study, including mastery of content, mastery of skills, exercising control over academic life, completing one's degree, study skills, time management skills, note taking, meeting the demands of difficult tasks, participating in class, seeking help, reading course materials, and retaining information. The items of this measure were adapted from existing scales including ASE (Chemers et al., 2001), CASES (Owen & Froman, 1988), CSEI (Solberg et al., 1993), MSLQ (Pintrich et al., 1991), PALS (Midgley et al., 2000), SELF-A (Zimmerman & Kitsantas, 2007), Self-Efficacy for Self-Regulated Learning questionnaire (Zimmerman et al., 1992), unnamed ASE measure by Aimé et al. (2017), and unnamed ASE measure by Sander and Sanders (2003). The supplemental measure consists of 24 items (see Appendix E for the Self version of the supplemental scale and Appendix F for the Other version) rated on 7-point numerical scale that ranged from 1 (strongly disagree) to 7 (strongly agree). Responses were averaged to create a final score that represents one's Other ASE. A higher score implies a higher level of ASE.

Social Desirability

The Social Desirability Scale (Crowne & Marlowe, 1960) consists of 33 true or false questions (e.g., "Before voting I thoroughly investigate the qualifications of all the candidates.") If participants select the socially desirable answer, they will receive one point. Depending on the

wording of the question, some questions were reversely coded so that “yes” would correspond with socially desirable behaviors. Scores were then summed to form total scores, where higher scores represent greater social desirability. According to Crowne and Marlowe (1960), this scale has an internal consistency coefficient of .88. For more details about this measurement, see Appendix G.

Academic Procrastination Scale – Short Form (APS-S)

Students’ procrastination level is measured for further investigation of other factors that influence students’ academic outcomes. The Academic Procrastination Scale-Short Form (APS-S) is a questionnaire that measures the procrastination level of students (Yockey, 2014). Two versions of APS-S were used in the current study: self-version of the APS-S and other-version of the APS-S. This scale consists of five items (see Appendix H for the Self version and Appendix I for the other version). Participants rated each item on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). An example item of this scale is “I put off projects until the last minute.” Responses were averaged across the five items to represent the procrastination level. Higher scores represent more serious procrastination. According to Yockey (2014), this scale is reliable with a Cronbach’s alpha of .87.

Student Adaptation to College Questionnaire (SACQ)

The Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1989) is a questionnaire designed to measure students’ adjustment to their college life in four aspects: academic, social, emotional, and institutional attachment. The questionnaire consists of 67 items. Each item is based on a numerical rating scale ranging from 1 (“Does Not Apply to Me at All”) to 9 (“Applies Very Closely to Me”). Items include “I feel that I fit in well as part of the college environment.” After reversely worded items were reverse-coded. A total average score for each

of the four aspects were calculated to represent the level of adaptation into college. Higher scores indicate more successful college adjustment. This questionnaire has internal reliability ranging from .83 to .89 for the academic aspect, .83 to .91 for the social aspect, .77 to .85 for the emotional aspect, and .85 to .91 for the institutional attachment (Baker & Sirky, 1989; Feldt et al., 2011). For a full list of items, see Appendix J.

Academic Behaviors

Academic behaviors in the current study were measured by asking participants to self-report different aspects of their own study habits for all of their classes during the first semester. Items include “How many assignments did you submit late or not at all this semester?”, “How many exams did you take late or not at all this semester?”, and “How many hours per week do you spend studying for all of your classes on average?” For a complete list of questions regarding students’ academic behaviors, please see Appendix K. Each participant’s score on each academic behavior question was converted to a standardized Z score and an average Z score was computed for each participant based on the Z score for each academic behavior question.

Academic Outcomes

Academic outcome in the current study is operationalized as first semester overall GPA, spring semester credits enrollment after spring census date (a proxy for fall to spring persistence), and letter grade in introductory psychology. These three indicators are obtained from the university Registrar’s Office. Further, the percentage of total points earned in introductory psychology was obtained from course instructors. These data were collected after the end of the first semester, which was the semester when students participated in the study.

Procedure

The current study was determined to be exempt from the Institutional Review Board of Radford University. The current study utilized a convenience sampling method. All participants were students enrolled in introductory psychology at Radford University, who participated in exchange for course credit. Information about the study was posted on SONA (SONA Systems Ltd., Tallin, Estonia), an online research participation management system, alongside other studies from the Psychology Department. Students who participated in both parts of the study received a total of two SONA credits (one for Time One and one for Time Two).

As part of a longitudinal, within-subjects, online-survey, study participants filled out the survey during two time periods: one at the beginning of the semester and one at the end of the semester. The first part of the study was distributed through SONA, which directed participants to the online study in Qualtrics (Qualtrics Inc., Provo, UT). After accessing the survey, participants were shown a consent form that informed participants of the general purpose of the study (see Appendix L). After providing consent, participants were asked to generate a code name for themselves following the instructions shown on the screen (see Appendix M), which was used to match participants' data across the two time periods. Subsequently, participants were asked to grant researchers permission to collect the participants' fall GPA, spring credit hour enrollment (reported after spring census date), and introductory psychology letter grades from the university Registrar's Office, and the participants' percentage of total points earned in introductory psychology from their instructor. Participants were then redirected to another Qualtrics survey that contained the questions for Part One of the survey.

Once in the Time One survey, participants were asked to reenter their code name. Next, all participants completed three measures of academic self-efficacy, with two versions of each

measure: the self-version and the other-version. The measures were completed in a nested, randomized order. Participants answered all three of the self-versions together in single block. Participants also answered the three other-versions in a single block. The order of the self and other blocks was randomized across participants. Within each block, the order of the ASES, SELAS, and the supplemental measures were also randomized. After completing all academic self-efficacy measures, participants proceeded to the section that measured procrastination (APS-S), which consisted of one self-version and one other-version. The order of taking those two versions was randomized. After the procrastination section, participants proceeded to the Social Desirability measure. Finally, participants answered demographic-related questions (see Appendix N). After participants had completed the survey, they were thanked for their time and told that they would receive an email around early November to ask them to take Part Two of the survey (see Appendix O).

Five weeks prior to the end of the first semester, participants who completed the first part of the study received an email that invited them to the second part of the study and contained their code name from Time One. During Time Two of the survey, participants provided their code name to help researchers match their profiles across two time periods. After typing in the code name, they moved on to complete the SACQ questionnaire. Next, participants were asked to complete the self- and other-versions of the academic self-efficacy and procrastination measures again, which followed the same format as Time One. Participants were then asked to respond to questions that measure their academic behaviors. After participants had completed all the measures, they were thanked and debriefed (see Appendix P). Researchers collected their course grades as well as their GPA at the end of the semester when classes were over.

Statistical Analyses Plan

Data Screening

The collected data undergoes the following screening procedures. First, those who take less than five minutes to answer the survey are excluded. Second, those who have an overall completion rate of less than 60% are excluded. Missing data are not used in data analyses. If someone's completion rate for a single measure (e.g., ASES) is lower than 60%, then that person's data for that single measure are excluded, but the rest of that person's data are still included. Third, a total of eight attention checks (four for time one and four for time two) are implemented to check whether participants are paying attention throughout the studies. One attention check is included for each measure that does not have negatively worded questions. Data will be removed for those who miss more than three attention checks. Additionally, data will be removed for those participants who show no variability across their responses.

Descriptive Analyses

Means, standard deviations, range, total number of answers, and Cronbach's alpha are reported for each measure included in the study for both time one and time two [i.e., ASES (Self & Other), SELAS (Self & Other), supplemental author-constructed measure of ASE (Self & Other), college adaptation, and academic behaviors]. Correlations between those measures are also calculated.

Data Reduction

Exploratory principal component analysis with varimax rotation is conducted to test the possibility of combining ASES and supplemental author-constructed measure. Those two measures are combined to represent the general measure of academic self-efficacy when the

average scores of those two measures showed high correlation with each other and form a single factor.

Demographic Analyses

To test for potential covariates, associations between the demographic variables (i.e., age, ethnicity, relationship status, education status of parents, place growing up, household income, and gender) and the main variables of interest from time one and time two [i.e., ASES (Self & Other), SELAS (Self & Other), supplemental author-constructed measure of ASE (Self & Other), procrastination (Self & Other), social desirability, college adaptation, and academic behaviors] are tested.

Test of Hypothesis One

Hypothesis one states that there will be pluralistic ignorance (PI) present within Academic Self-Efficacy (ASE). More specifically, participants' average self ASE scores are expected to be significantly lower than their perceived others' ASE scores. A doubly repeated measures factorial ANOVA is used to analyze the differences between participants' average self-scores and average other-score for each of the different ASE scales (i.e., General SES Factor & SELAS) as well as the differences in magnitude of PI scores between two time points to investigate whether the magnitude of PI has changed with time.

Test of Hypothesis Two

Hypothesis two states that each participant's magnitude of PI during both time points, which is calculated by subtracting the average of the self-scores from each participant's other-score, will be negatively associated with their final academic performance (i.e., introductory psychology percentage grade and semester GPA). More specifically, each participant's PI score in each type of ASE measure during both time one and time two (six PI scores in total) will be

negatively associated with both their final course grade and final GPA for their first semester. If the exploratory principal component analysis supports the combination of ASES and supplemental author-constructed measure, then there will be four PI scores in total (General ASE factor score and SELAS during two time points) among the tests of association with introductory psychology percentage grades and semester GPA.

Regression analysis is used to test the relationship between PI score and academic performance (final course grade and first-semester GPA). Because the PI score is calculated by subtracting the average of the self-scores from each participant's perceived other-score and these scores are highly correlated, PI magnitude scores is first residualized to remove the variability of self-scores. The residual score is created by regressing the PI scores on the self-scores and then subtracting the PI scores predicted by the regression equation from the actual PI score values. The residualized PI score is then used to conduct the regression analysis with academic performance variables.

Test of Hypothesis Three

Hypothesis three states that the negative correlation between PI score and academic performance will be mediated by participants' average Z-scores on academic behaviors. More specifically, higher PI scores will lead to fewer academic behaviors, and fewer academic behaviors will lead to lower academic performance (see Appendix Q Figure 1). This mediation analysis is conducted specifically 1) between ASES and semester GPA, 2) between SELAS and introductory psychology percentage grade, and 3) between supplemental author-constructed measure and semester GPA. If exploratory principal component analysis supports the combination of ASES and supplemental author-constructed measure, then one and three will be combined.

For each of the three (or two) mediation models, a total of four tests are conducted (see Appendix Q Figure 1). First the “c” path is evaluated, which is expected to be a negative association between PI score and academic performance. Second, the “a” path is evaluated, which is expected to be a negative association between PI scores and academic behaviors. Third, the “b” and “c” paths are estimated in the same multiple regression model by regressing academic outcomes on PI magnitude and academic behaviors in the same step. The “b” path tests the effect of academic behaviors on academic performance when PI score is controlled. The “c” path tests the effect of PI score on academic performance when academic behaviors is controlled. Finally, a plugin of SPSS called Process will be used to obtain bootstrapped confidence intervals that test the significance of the indirect ($a*b$) effect, which indicates at the portion of the total effect of PI scores on academic performance that is explained by academic behaviors.

Test of Hypothesis Four

Hypothesis four states that the negative association between PI scores and academic performance will also be mediated by participants’ academic adjustment and institutional attachment measured by SACQ (see Appendix Q Figure 2). More specifically, higher PI scores will lead to lower levels of academic adjustment and lower levels of institutional attachment. Lower levels of academic adjustment and institutional attachment will subsequently lead to lower academic performance. This mediation analysis is conducted specifically 1) between ASES and semester GPA through academic adjustment, 2) between SELAS and introductory psychology percentage grade through academic adjustment, 3) between supplemental author-constructed measure and semester GPA through academic adjustment, 4) between ASES and semester GPA through institution attachment, 5) between SELAS and introductory psychology percentage grade through institutional attachment, and finally 6) between supplemental author-

constructed measure and semester GPA through institutional attachment. If exploratory principal component analysis supports the combination of ASES and supplemental author-constructed measure, then one and three will be combined, as well as four and six.

For each of the six (or four) mediation models stated above, a total of four tests is conducted (see Appendix Q Figure 2). First, the “c” path is analyzed, which is expected to be a negative association between PI score and academic performance. Second, the “a” path is analyzed, which is expected to be a negative association between PI score and academic adjustment/institutional attachment. Third, “b” and “c” paths are analyzed in the same multiple regression model by regressing academic outcomes on PI magnitude and academic adjustment/institutional attachment in the same step. The “b” path tests the effect of academic adjustment/institutional attachment on academic performance when PI score is controlled. The “c” path tests the effect of PI score on academic performance when academic adjustment/institutional attachment is controlled. Finally, a plugin of SPSS called Process will be used to obtain bootstrapped confidence intervals that test the significance of the indirect ($a*b$) effect, which indicates at the portion of the total effect of PI scores on academic performance that is explained by academic adjustment/institution.

Chapter 3

Results

Data Screening

A total number of 146 participants were recruited for time one. Participants who spent less than five minutes on the survey, completed less than 60% of the survey, missed more than one attention check item, showed no variance in responses for more than two scales utilizing reverse scored items, or who were not freshman in their first semester of college were excluded

from the dataset. For time one, 45 participants were excluded based on those standards, which resulted in 101 participants left. For time two, 72 participants from time one returned to take the second portion of the study. Using the same procedure of data screening, 11 participants were excluded from the time two dataset, which resulted in 61 participants left. When data from Time One and Time Two were combined together, a final number of 44 participants' data were included in the main analyses after the screening standards of both time one and time two were executed.

Data Reduction Analyses

Exploratory principal component analysis (PCA) with varimax rotation was implemented to test whether the Academic Self-Efficacy Scale (ASES) and the supplemental author-constructed measure (SACM) of self-efficacy could be combined into a single measure. These analyses were conducted separately for both the self-scores and other-scores at both time one and time two. Within each analysis, the scale score for the ASES (average of the scale items) and scale score for the SACM (average of the scale items) were both entered in the PCA. With respect to the two measures of self during time one, only one factor with an eigen value greater than 1.00 (1.762) was extracted, which accounted for 88.10% of the total variance (see Appendix R Table 1). The ASES and SACM at time one were significantly and positively correlated with each other, $r(98) = .76, p < .001$. With respect of two measures of others during time one, one factor with an eigen value of 1.60 was extracted, which captured 80.20% of the variance (see Appendix R Table 1). The two measures of others' attitudes during time one also were significantly and positively correlated, $r(98) = .60, p < .001$. As a result, combining the two measures of self and combining the two measures of others during time one were justified.

As for the two measures of self during time two, the same type of exploratory principal component analysis with varimax rotation indicated one factor with an eigen value of 1.83 that explained 91.53% of variance (see Appendix R Table 2). The two measures of self were significantly and positively correlated with each other, $r(42) = .83, p < .001$. For the two measures of others during time two, one factor with an eigen value of 1.82 that explained 91.04% of variance was extracted (see Appendix R Table 2). The two measures also were significantly and positively correlated with each other, $r(42) = .82, p < .001$. Therefore, combining the two measures for self and combining the two measures for others during time two were also justified.

Descriptive Analyses

A series of bivariate correlation analyses were used to analyze the relationships between time one academic self-efficacy (ASE) variables (i.e., SELAS-Self, SELAS-Other, Combined ASE-Self, and Combined ASE-other) and end-of-semester academic performance variables (i.e., introductory psychology class percentage grades and first semester GPA). Overall, introductory psychology grades were significantly and positively correlated with time one SELAS-Self and time one Combined ASE-Self; and first semester GPA was significantly and negatively correlated with time one Combined ASE-Other. See Appendix R Table 3 for more details on correlation coefficients, means, standard deviations, number of participants, and Cronbach's alpha for the time one variables. A second set of bivariate correlation analyses was used to analyze the relationships between time two ASE variables (i.e., SELAS-Self, SELAS-Other, Combined ASE-Self, Combined ASE-Other), Student Adaptation to College variables (i.e., Academic Adjustment, Social Adjustment, Personal Emotional Adjustment, and Institutional Attachment), academic behaviors, and end-of-semester academic performance variables. Both

time two SELAS-Self and time two Combined ASE-Self were significantly and positively correlated with introductory psychology grades, first semester GPA, students' academic adjustment, as well as students' institutional attachment (see Appendix R Table 3).

Bivariate correlations between time one SELAS-Self and Combined ASE-Self were also conducted. Overall, the two self-ratings of ASE were strongly correlated with each other at both time one [$r(99) = .73$] and time two [$r(42) = .57$], suggesting students who were high in overall ASE were also high in ASE regarding introductory psychology class. The two other-ratings of ASE (i.e., SELAS-Other & Combined ASE-Other) were also significantly and positively correlated with each other at both time one [$r(99) = .56$] and time two [$r(42) = .72$], suggesting that students who think their classmates in introductory psychology classes are high in ASE also tend to think the average college student is high in ASE.

Demographic Analyses

A series of bivariate correlations and one-way ANOVAs were used to analyze the potential associations between main target variables [i.e., SELAS (self & other for both time one and time two), Combined ASE (self & other for both time one and time two), Intro to Psyc class final percentage grade, semester GPA, academic adjustment subscale of Student Adaptation to College (SACQ) and institution attachment subscale of SACQ] and demographic variables (i.e., ethnicity, gender, age, high school GPA, mother education, father education, and income).

Ethnicity was recoded into four categories (i.e., "Caucasian/European American/White," "African American," "Multi-Ethnic," and "Other") because some categories had fewer than two people. Based on the results of one-way ANOVAs, ethnicity did not have an impact on any of the main target variables during either time one or time two, all p values ranged between .330 to .939.

Gender was also recoded into three categories (i.e., “Male,” “Female,” and “Non-Binary/Prefer not to Answer”) because some initial categories had fewer than two people. One-way ANOVAs indicate gender did not have an impact on any of the main target variables during time one, p ranged between .239 to .854. At time two, males reported significantly higher Combined ASE for themselves ($M = 5.40, SD = .89$) compared to what females reported for themselves ($M = 4.66, SD = .89$), $t(40) = 2.49, p = .017, d = .83$. No other gender by time two analyses were significant.

High school GPA was significantly correlated with time one SELA-self, $r(99) = .20, p = .048$, time one Combined ASE - self, $r(99) = .20, p = .048$, time two SELA-self, $r(42) = .47, p = .001$, final introductory psychology percentage grade, $r(92) = .66, p < .001$, and fall GPA, $r(96) = .61, p < .001$. Age was not significantly correlated with any of the main target variables for time one and time two, correlation coefficients ranged between -.02 to .22.

With respect to parental education variables, mother education was recoded into seven categories because two of the original categories had fewer than two participants. Those two categories were instead merged into an “other” category. Recoded mother education was not significantly associated with the main target variables during time one with eta squared values range from .04 to .07. At time two, mother education was significantly associated with participants ratings of their own Combined ASE as well as their institutional attachment (see Appendix R Table 4). More specifically, participants whose mother did not complete high school and those whose mother completed high school reported significantly higher Combined ASE scores compared to the “other” group. The “other” group also reported significantly less institutional attachment compared to those whose mother did not complete high school and to those whose mother completed high school. Father education was not significantly associated

with the main target variables at time one nor time two, eta squared range from .02 to .31. As for household annual income, there were no significant associations with main target variables and income during time one or time two, eta squared ranged from .04 to .19

Associations between demographic variables and the main variables of interest were limited. Demographic variables were eliminated from further analysis.

Main Analyses

Hypothesis One

Hypothesis one of the current study proposed there is pluralistic ignorance (PI) within students' perception of other students' academic self-efficacy (ASE). More specifically, hypothesis one predicted students would mistakenly overestimate other students' ASE, and thus students would think their own ASE is not as high as other students'. A doubly repeated measure factorial ANOVA was used to include the potential change in ASE scores (both self and other) across time one and time two. This analysis was conducted for both SELAS and Combined ASE measures of ASE.

A 2 (Target: self vs. other) x 2 (Time) doubly repeated measure factorial ANOVA for SELAS suggested a significant main effect for target, $F(1, 43) = 9.39, p = .004, \eta^2_p = .18$. When scores from time one and time two are combined, SELAS-Self scores ($M = 5.35, SE = .12$) are significantly higher than SELAS-Other scores ($M = 4.94, SE = .12$). However, there was not a significant main effect for time, $F(1, 43) = .90, p = .347, \eta^2_p = .02$, nor a significant interaction between time and target, $F(1, 43) = .39, p = .534, \eta^2_p = .01$ (see Appendix R Table 5). Further simple effect analyses suggest that during time one, participants reported significantly higher SELAS-Self scores ($M = 5.39, SD = .80$) than SELAS-Other scores ($M = 5.04, SD = .80$), $t(43) = 2.67, p = .011, d = .40$. During time two, participants also reported significantly higher SELAS-

self scores ($M = 5.31$, $SD = 1.25$) than SELAS-other scores ($M = 4.84$, $SD = .98$), $t(43) = 2.51$, $p = .016$, $d = .38$.

A 2 (Target: self vs. other) x 2 (Time) doubly-repeated measure factorial ANOVA for Combined ASE suggested a significant main effect of target, $F(1, 43) = 35.48$, $p < .001$, $\eta^2_p = .45$. When scores from time one and time two are combined, Combined ASE-Self ($M = 4.87$, $SE = .11$) are significantly higher than Combined ASE-Other ($M = 4.27$, $SE = .08$). However, there was not a significant main effect for time, $F(1, 43) = .20$, $p = .657$, $\eta^2_p = .01$, nor a significant interaction between target and time, $F(1, 43) = .01$, $p = .930$, $\eta^2_p = .00$ (see Appendix R Table 6). Further simple effect analyses suggest that during time one, participants reported significantly higher Combined ASE-Self scores ($M = 4.89$, $SD = .72$) than Combined ASE-Other scores ($M = 4.29$, $SD = .50$), $t(43) = 6.32$, $p < .001$, $d = .95$. During time two, participants also reported significantly higher Combined ASE-Self scores ($M = 4.85$, $SD = .94$) than their Combined ASE-Other scores ($M = 4.25$, $SD = .69$), $t(43) = 4.73$, $p < .001$, $d = .71$.

Overall, even though there were significant differences between participants' self-scores and other-scores, which suggested the presence of PI, the direction of the relationship did not align with the original hypothesis. Hypothesis one predicted students would overestimate other students' ASE, which would be expressed by showing lower average self-scores compared to the other-scores. However, analyses suggested that average self-scores were higher than the other-scores, which indicated that students tend to underestimate other students' ASE. Therefore, hypothesis one was only partially supported.

Hypothesis Two

Hypothesis two predicted the magnitude of students' misestimation (overestimation) is going to negatively correlate with their final academic performance (i.e., final percentage grade

for introductory psychology class, and first semester GPA), which means the more students overestimate others' ASE, the worse they are going to do in their classes. Magnitude of PI (PI magnitude score) is calculated by subtracting the average of the self-scores (the true average) from participants' estimated other-scores. The difference score was then residualized by regressing the self-scores onto it, which takes out the variability of self-scores, because the significant correlation between ASE self-scores and academic performance and PI magnitude scores might result in a multicollinearity problem. Regression analyses were then used to test whether PI scores significantly predicted students' academic performance.

Bivariate correlations suggested SELAS PI magnitude scores during time one do not significantly predict introductory-psychology course grades, $r(92) = -.14, p = .171$, nor fall semester GPA, $r(96) = -.12, p = .251$. SELAS PI magnitude scores during time two do not significantly predict introductory-psychology course grades, $r(45) = -.06, p = .710$, nor first semester GPA, $r(45) = -.07, p = .626$, either. Bivariate correlations suggested Combined ASE PI magnitude scores during time one are significantly and negatively correlated with introductory psychology course grades, $r(92) = -.32, p = .002$, and first semester GPA, $r(96) = -.37, p < .001$. In other words, the more the participants overestimate the average college student's ASE, the lower their introductory psychology grades were. However, bivariate correlations suggested that Combined ASE PI magnitude scores during time two are not significantly correlated with introductory-psychology course grades, $r(44) = -.18, p = .221$. Yet, Combined ASE PI scores during time two are significantly and negatively correlated with first semester GPA, $r(44) = -.33, p = .022$, suggesting that the more the participants overestimate the average college student's ASE, the lower was their first semester GPA.

Overall, hypothesis two was partially supported. Magnitude of PI within students' ASE regarding their introductory psychology class was not significantly correlated with first-semester GPA nor introductory-psychology course grade. Yet, the magnitude of PI within students' general sense of ASE is significantly correlated with first semester GPA at both time one and time two, which suggests that the more overestimation of average college student's ASE one makes, the lower the GPA. Magnitude of PI within students' general sense of ASE is also significantly correlated with introductory psychology course grades (time one only), suggesting that the more overestimation of average college student's ASE one makes, the lower the introductory psychology grades one.

Hypothesis Three

Hypothesis three predicted that the negative correlation between PI magnitude scores and academic performance will be mediated by participants' academic behaviors (e.g., class participation). More specifically, high PI magnitude scores would correlate with fewer academic behaviors and fewer academic behaviors would further correlate with lower academic performance. PI magnitude scores within SELAS during both time one and time two were used to predict introductory psychology course grades, and PI magnitude scores within Combined ASE during both time one and time two were used to predict first semester GPA.

To test this mediation relationship, the "c" path between PI scores and academic performance was tested first. The "c" path between Combined ASE PI magnitude scores and first semester GPA, during both Time One [$\beta = -.46$, $b = -.88$, $SE = .26$, $t(42) = -3.39$, $p = .002$] and Time Two [$\beta = -.35$, $b = -.47$, $SE = .19$, $t(42) = -2.40$, $p = .021$], was significant based on the results of linear regression analyses. However, the "c" paths between SELAS magnitude scores and introductory psychology course grades during Time One [$\beta = -.12$, $b = -1.70$, $SE = 2.15$, t

(42) = $-.79, p = .432$] and Time Two [$\beta = -.07, b = -.78, SE = 1.78, t(42) = -.44, p = .662$] were not significant. The relationship between Combined ASE PI magnitude scores and academic behaviors (the “a” path) was not significant at either Time One [$\beta = -.00, b = -.00, SE = .17, t(42) = -.02, p = .984$] or Time Two [$\beta = .04, b = .03, SE = .12, t(42) = .23, p = .817$]. Since assumptions of mediation were not met for any of the mediation analyses suggested by hypothesis three. No further analyses were conducted and hypothesis three was not supported.

Hypothesis Four

Hypothesis four predicted that the negative correlation between PI magnitude scores and academic performance can be mediated by students’ academic adjustment into college and students’ attachment to the institution. More specifically, higher PI magnitude scores in ASE was hypothesized to correlate with both lower academic adaptation and lower institution attachment, which would then associate with lower academic performance. PI magnitude scores within Combined ASE during both time one and time two would be used to predict overall semester GPA, and PI magnitude scores within SELAS during both time one and time two would be used to predict introductory psychology course grade. For each of the associations stated above, two mediation analyses would be conducted (once for academic adjustment and once for institution attachment), which resulted in eight total mediation analyses.

As stated in hypothesis three, associations between PI scores within SELAS (during both time one and time two) and academic performance (the “c” paths) were not significant. Therefore, no further analyses were conducted for those four analyses. The association between PI magnitude scores within Combined ASE (during time one and time two) and academic performance (the “c” paths) were significant. Therefore, associations between PI scores within Combined ASE (during both time one and time two) and the two mediators (academic

adjustment and institution attachment)—the “a” paths—were further analyzed. However, PI magnitude scores within Combined ASE during Time One [$\beta = -.22, b = -.74, SE = .50, t(42) = -1.48, p = .146$] and Time Two [$\beta = -.15, b = -.35, SE = .36, t(42) = -.99, p = .329$] did not significantly predict academic adjustment. PI magnitude scores within Combined ASE during Time One [$\beta = -.16, b = -.55, SE = .54, t(42) = -1.01, p = .316$] and Time Two [$\beta = -.12, b = -.29, SE = .38, t(42) = -.76, p = .452$] did not significantly predict institutional attachment either. Hence, no further steps were taken and hypothesis four was not supported.

Supplementary Analyses

Since PI magnitude scores can be inflated if participants choose to underreport their peers' ASE scores and/or overreport their own ASE scores, supplemental analyses were conducted to assess whether social desirability potentially explains the discrepancies between self and other ratings. Marlowe and Crowne's Social Desirability measure (see Appendix G) in the current study was used to categorize participants' social desirability levels ($M = 1.53, SD = .17$, ranged from 1.09 to 1.91, $\alpha = .80$) into high and low groups using a median split procedure (median = 1.55). Those who scored under 1.55 were put into the low-social desirability group ($N = 57$) and those who scored at or above 1.55 ($N = 44$) were put into the high-social desirability group. A 2 (Target of rating: Self vs. Other; within subjects) x 2 (Social Desirability; high vs. low) mixed model ANOVA tested whether the differences between participants' own ASE scores and participants' perceptions of their peers' ASE scores for both SELAS and Combined ASE measures were moderated by social desirability.

In analysis of SELAS during time one, the main effect of target was significant (see Appendix R Table 8). Participants rated themselves as having significantly higher levels of SELAS ($M = 5.39, SD = .79$) than their peers ($M = 5.07, SD = .82$), $p < .001, \eta^2_p = .15$. Neither

the main effect for social desirability nor interaction was significant. In analysis of Combined ASE during time one, the main effect of target was significant (see Appendix R Table 8). Participants rated themselves as having significantly higher levels of Combined ASE ($M = 4.90$, $SD = .69$) than their peers ($M = 4.32$, $SD = .51$), $p < .001$, $\eta^2_p = .51$. The main effect of social desirability was significant for Combined ASE. Participants with higher social desirability reported significantly higher Combined ASE (“Self” and “Other” combined; $M = 4.49$, $SE = .07$) than participants with low social desirability ($M = 4.78$, $SE = .08$), $p < .001$, $\eta^2_p = .99$. The interaction effect was also significant for Combined ASE during time one (see Appendix Q Figure 3), $F(1,99) = 7.54$, $p = .007$, $\eta^2_p = .07$. Simple effects tests show that participants with high social desirability reported significantly higher Combined ASE about themselves ($M = 5.15$, $SD = .78$) than they reported for others ($M = 4.40$, $SD = .53$), $t(43) = 6.89$, $p < .001$, $d = 1.04$. Nonetheless, participants with low social desirability still reported significantly higher general ASE about themselves ($M = 4.71$, $SD = .55$) than for others ($M = 4.27$, $SD = .50$), $t(56) = 7.41$, $p < .001$, $d = .98$., suggesting that although social desirability accounts for some of the discrepancy between self and others (PI) during time one, it does not fully explain the discrepancy.

As for time two, the main effects of target were significant for both SELAS and Combined ASE (see Appendix R Table 8). Participants rated themselves as having significantly higher levels of SELAS ($M = 5.31$, $SD = 1.25$) than their peers ($M = 4.84$, $SD = .98$), $p = .018$, $\eta^2_p = .13$, and higher Combined ASE ($M = 4.85$, $SD = .94$) than their peers ($M = 4.25$, $SD = .69$), $p < .001$, $\eta^2_p = .34$. Neither main effects for social desirability nor interaction effects were significant for SELAS and Combined ASE, suggesting that social desirability did not account for any of the discrepancy between self and others during time two.

Chapter 4

Discussion

Hypothesis one states participants would on average overestimate their peers' academic self-efficacy (ASE), providing preliminary evidence of pluralistic ignorance (PI) within academic attitudes. Participants significantly misestimated both their classmates' and the average college student's ASE, and participants significantly underestimated others' ASE instead of overestimating. In other words, participants perceived others as being less academically self-efficacious than they truly were. These findings are contrary to the initial hypothesis. Originally, it was proposed that highly-achieving students might appear to be more salient in the classroom (e.g., raising their hands and answering questions), compared to moderately- and poorly-performing students (e.g., reluctant to participate in classroom). Thus, it was predicted that students' perception of their peers might be biased and inflated due to the disproportionate influence of highly achieving students. However, instead of overestimating other students' ASE, participants in the current study underestimated others' ASE.

One potential explanation for these findings is that participants self-reports may not reflect their true ASE beliefs; rather, they may be distorted by social desirability concerns. Supplemental analyses suggest that the unexpected pattern of results may be partially explained by participants' social desirability, where participants over-report their own ASE and under-report others' ASE in the service of impression management. As a result, a pattern that resembles PI (ratings made for self being significantly higher than ratings made for peers) was generated not because participants misestimated their peers' efficacy, but because participants were partially misrepresenting their true opinions. When social desirability was included as a moderating variable, the magnitude of PI appears to be inflated among participants with a

stronger tendency to report in a socially desirable manner. However, that does not completely explain the results. Among participants with low social desirability scores, the pattern of PI is still present, even though the magnitude is significantly smaller compared to the group of participants with high desirability. Therefore, although social desirability was responsible for part of the observed discrepancy for self and other ratings, it did not completely undermine the evidence for PI.

Overall, results supported the claim that PI exists in academic settings beyond cheating and hours of study (Buzinski et al., 2018; Henningsen & Henningsen, 2020). Although results did not support the initial hypothesis, the pattern of PI observed in the present study is consistent with Buzinski et al.'s (2018) findings that students significantly underestimate the number of hours their peers put into studying for exams. Hypothesis two states that overestimating peers' ASE would be associated with lower academic success (introductory psychology course grades and first semester GPA). Overall, this hypothesis is largely supported. PI within Combined ASE scores (measured by subtracting the average self-scores from each participant's perceived peers' scores; thus, more positive scores represent higher degrees of overestimation) were significantly and negatively associated with both performance in introductory psychology and first-semester GPA. That is, the participants who felt their peers were more efficacious than themselves (a high and positive PI magnitude score) had lower grades than participants who felt their peers were less efficacious than themselves (a strong but negative PI magnitudes score). However, ASE assessed specifically for an introductory psychology class measured by SELAS did not significantly predict academic performance.

It should be noted that the variability within participants' own ASE was removed from the PI magnitude score. Therefore, the resulting correlation between PI magnitude scores and

academic performance was not due to the collinearity between PI magnitude scores and ASE self-scores, which has been suggested to significantly and positively correlate with academic performance (Honicke & Broadbent, 2016). Instead, what was left in the PI magnitude score should only be the participants' amount of misestimation.

The significant negative correlation between PI magnitude scores and academic performance also aligns well with Buzinski et al.'s (2018) finding that the more that students underestimate the number of hours their peers study, the higher the scores students tend to get on tests. Yet, it is surprising that PI within academic self-efficacy in general is significantly and negatively associated with both performance in introductory psychology and overall GPA, whereas PI within academic self-efficacy specifically regarding introductory psychology did not predict performance in introductory psychology or overall GPA, since previous literature review on ASE suggests that ASE measured for a specific class is a better predictor of performance in that class compared to ASE measured for general academic settings (Honicke & Broadbent, 2016).

For a pattern such as this to take place, it might be that misestimation of peers' ASE itself does not predict academic performance. Instead, it is the perceived lack of preparedness for college/class that predicts academic performance, and students' perceived lack of preparedness might lead to misestimation of peers' ASE (signs of PI) under certain situations. As suggested by the results of Buzinski et al. (2018), students who overestimate their peers' study time also tend to think they are not prepared for the class exams. Similarly, when participants in the current study were asked to estimate the average college students' general level of ASE for college work, for whom participants have had few interactions, participants might use perceptions of their own lack of preparedness for college as a basis for estimating the "average student" ASE.

This could be especially true given that participants in the current study were freshmen in their first semester of college, who have not yet had many opportunities to interact with a broad range of students on campus. If participants think they are not prepared for college, they would report their own ASE as lower than their peers' ASE. At the same time, lack of preparedness would also lead to lower academic performance, which aligns with the results of the current study. However, when participants in the current study were asked to make estimations about their introductory-psychology classmates, with whom participants have had some direct interactions, instead of participants using perceptions of their own lack of preparedness for introductory psychology as the basis for estimation, participants' estimates reflect participants' actual misestimation of peers' ASE resulting from participants' actual interactions with their peers.

As for hypothesis three, since PI scores within ASE were not significantly correlated with academic behaviors (e.g., office hour utilization, average study time per week, class participation, etc.), the mediating role of academic behaviors within the relationship between PI within ASE and academic performance, suggested in the initial hypothesis, was not supported. Further, correlations between academic behaviors and academic performance were not significant. A pattern such as this might suggest the inappropriate operational definition of academic behaviors. In the current study, academic behaviors were defined as students' participation in office hours, utilization of tutoring, utilization of study groups, participation in classes, average hours of study per week, number of classes missed, late assignment submission, late exams, and effort being put into studying. It is possible that some of the listed academic-related activities are not effective predictors of one's academic performance. As a result, academic behaviors measured in the current study did not correlate with participants' academic performance. It is also possible that since participants in the current study were from

introductory psychology classes, they experienced relatively lower academic-related challenges compared to more advanced college classes, which might make those extra academic-related behaviors less influential on grades for the participants. In addition, as college freshmen who just graduated from high school, participants might not have fully understood how to utilize extra resources, such as the academic behaviors measured in the current study, to succeed in their college-level classes. Furthermore, it should also be noted that academic-related behaviors in the current study were measured through participants' self-reports. It is possible that they do not represent participants' true frequency of engaging in those academic-related behaviors due to factors such as demand characteristics and inaccurate memories.

Hypothesis four predicted that the negative relationship between PI within ASE and academic performance can be explained by students' academic adjustment and their institutional attachment. It was predicted that if students mistakenly overestimated their peers' ASE, they were going to perceive themselves as being deviant from the average college student. As a result, they would experience difficulties adjusting academically to the college environment and forming an attachment to the institution, which would eventually impact their academic performance. However, contrary to this rationale, results suggested students' academic adjustment and institution attachment were not significantly correlated with their misestimation of their peers' ASE, but both academic adjustment and institution attachment were significantly correlated with academic performance, suggesting both measures have some degree of validity.

The lack of associations between PI magnitude scores during time one and academic adjustment and institutional attachment might be due to the lack of statistical power because of data attrition for wave two data collection. At the same time, although it is not tested statistically, it is interesting to see that correlation coefficients between PI magnitude scores and academic

adjustment and institutional attachment decreased drastically from time one to time two (see Appendix R Table 3). This might suggest that one's misestimation of peers and others' ASE scores at the beginning of the first semester has better ability in terms of predicting one's academic adjustment and institutional attachment during first semester than one's misestimation at the end of the first semester.

Strength and Limitation

One of the strengths of the current study is that multiple aspects of ASE (e.g., class participation, reading efficacy, persistence/motivation for disliked subjects, etc.) are included in the measure of ASE (Aimé et al., 2017; Chemers et al., 2001; Owen & Froman, 1988; Sander & Sanders, 2003; Zimmerman & Kitsantas, 2007). Compared to measures in the past that only assess certain aspects of ASE (Honicke & Broadbent, 2017), assessing multiple aspects of ASE provides the opportunity to include as much variability that can be accounted by ASE as possible.

The current study also assessed participants' estimation about their peers' ASE during the first month of the first semester and during the last month of first semester. This made monitoring of PI magnitude change possible. PI magnitude change has been something not frequently measured or monitored across various studies of PI (Sargent & Newman, 2021; Prentice & Miller, 1993), because most studies on PI only provided snapshot evidence of it, and it remained unclear whether PI observed in those studies would change across time. Monitoring of PI magnitude change made several assumptions in the PI literature testable. For example, Prentice and Miller (1993) found that male college students who previously misperceived college drinking norms shift their attitudes later to better fit with the misperceived group norms, and students that did not change their attitudes reported reduced ties with the group, which can

potentially buffer against negative consequences of group norm deviations. Although the current study did not find changes in average PI magnitude scores across time, it still added to the literature of PI within academic settings, which PI within ASE might not necessarily increase or decrease after a period of time of at least one semester.

In order to prevent previous exposure to college environment from affecting the average estimation of other students' ASE in the current study, a sample of college freshmen in their first semester was recruited. More importantly, since the study was conducted in the first semester, those college freshmen should not have had any previous long-term exposure to their college peers nor have their attitudes shifted because of normative influence, which makes the study of the difference between estimated norm and true norm possible. Otherwise, participants ratings of their own ASE and their peers' ASE might be confounded by the time participants have spent in college environments. For example, those who spent more time in college might have more "accurate" estimations of their peers. The reasons behind this are not only the possibility that more interactions can lead to more accurate estimations, but also the possibility that their behaviors and attitudes can shift across time toward their perceived norm.

The current study also included social desirability measures as part of the study procedures, so that if participants on average underestimated others' ASE, the social desirability measure could be used to see whether the misestimation of peers' ASE was due to participants' tendency to over-report their own ASE and under-report others' ASE in the service of self-enhancement. Additionally, since the current study planned on testing the associations between PI within ASE and academic performance, first semester GPA and introductory psychology class grades were collected from university officials and introductory psychology class instructors

instead of self-reported grades to eliminate the possibility of participants reporting false information and provide more accurate measures.

However, limitations of the current study should also be noted. The current study utilized convenience sampling method and only recruited participants who attended introductory psychology class. Although the introductory psychology class had a larger ratio of students from other majors compared to more advanced psychology classes, it is hard for the results of the current study to generalize to other college freshmen or students other than college students. Additionally, since the current study focused on freshmen students' adaptation into college, only first-year freshmen were included in the study. Therefore, the generalizability of results to other college students (i.e., sophomore, juniors, and seniors) is questionable.

While the current study collected GPA and introductory psychology course grades information as participants' academic performance, researchers in the future should contemplate the true meaning of these pieces of information. For instance, GPA represents a student's overall performance across the entire semester. Yet, that performance usually consists of students' performance on their various tests across the semester. Since the current research measured students' PI scores at both the beginning and the end of the semester, it is questionable whether overall performance scores (e.g., GPA) should be used as the criterion variables, given that students' PI scores at the end of the semester theoretically should not predict their scores at the beginning of the semester. Therefore, similar research in the future that measures students' attitudes and/or behaviors across various time points should include criterion variable measures that provide time-sensitive changes, such as individual tests grades instead of overall class grades.

Lastly, the current study went through severe participant attrition between time one and time two. Given that time one only had 101 valid cases for use and only fewer than half of them participated in time two study, the current study's statistical analyses lack the statistical power to discover significant relationships (e.g., academic adjustment, institutional attachment, and academic behaviors).

Implications

Overall, the current study extended the existing literature of PI studies in the following three aspects: 1) consequences of PI, 2) effects of accuracy score, and 3) change in PI across time. First, the current study results not only supported the presence of PI in academic self-efficacy, but also suggested the potential outcomes of PI within ASE. The more participants underestimated their peers' ASE, the higher their grades would be (and vice versa). Second, it is interesting to see that the accuracy of one's estimation does not predict their performance. The direction of the estimation also matters. Therefore, it is important for researchers in the future who are interested in PI to consider not only the importance of accurately perceiving people's attitudes, but also to consider the effects of simple underestimation or simple overestimation. For example, individuals might respond differently if they see others as better than themselves versus seeing others as worse than they are. Hence, it is questionable whether it is important for participants to correctly perceive the norm around them at all, since the current study suggested that underestimation clearly leads to a better outcome than overestimation or accurate estimation, which is similar to the idea of positive illusion (Chung et al., 2016).

Thirdly, the current study did not find evidence of changes in participants' misestimations across their first semester. In Prentice and Miller's study (1993), they found male participants shifted their own attitudes regarding alcohol toward their misestimated peers'

attitudes regarding alcohol. In other words, the magnitude of PI got smaller. In the current study, similar to what Prentice and Miller (1993) found among female participants, results did not indicate a significant main effect of time or a significant interaction between time and PI magnitude, which suggested that the average PI magnitude stayed about the same across time. This difference between past research and the current study might reflect differences in the amenability of behaviors. It might suggest that shifting one's attitudes and/or behaviors toward alcohol (at least among males) is easier than shifting one's academic behaviors. Alternatively, it might also be that students are reluctant to change their behaviors (i.e., ASE) even though they perceive themselves to be deviating from the norm. If students perceive other students' abilities to be lower than their own, it is unrealistic for them to lower their own abilities toward their perceived others with lower abilities according to social comparison theory (Festinger, 1954).

Finally, Honicke and Broadbent (2016) suggested that the later students' ASE are measured, the more weight they are going to have in terms of predicting their final academic performance, and our results support this claim (see Appendix R Table 3). This is because people can have more accurate understandings of their own ASE when they are given enough time to correct it based on their past experiences. For example, ASE near the end of the semester is going to predict performance better than ASE at the beginning of the semester, because ASE near the end is based on students' experiences on their assignments and tests throughout the semester, which help them correct their beliefs about ASE. However, it seems that PI within ASE showed a different mechanism, which PI within ASE at the beginning of the semester showed better ability of predicting one's final academic performance. This might be that the underestimation of peers' ASE at the beginning made participants feel less stressed in the rest of

the semester, whereas underestimation at the end is too late to have effects on one's mental well-being and final grades.

Future Directions

It is important for future research to measure participants' perceived variability in other group members' attitudes. As suggested by Sargent and Newman (2021), individuals who deviate from the norm and perceive low variability in group members' attitudes might be more subject to normative influence compared to those who equally deviate from the norm but perceive a large degree of variability in group members' attitudes. Therefore, perceived degree of variability might serve as a moderator in the relationship between PI within ASE and academic performance.

Future research should also consider measuring several variables that can explain the negative relationship between PI within ASE and academic performance. For example, self-esteem might impact an individual's PI score, with those who are low on self-esteem being more likely to overestimate other people's ASE and those who are high on self-esteem being more likely to underestimate other people's ASE. Another variable that can possibly mediate the relationship between PI within ASE and academic performance is the perceived lack of preparedness as suggested by Buzinski et al. (2018). Students who overestimated others' ASE might feel less prepared for classes, while students who underestimated others' ASE might feel more prepared and confident for classes. Finally, future research should collect grades for every exam throughout the semester to correspond to participants' PI magnitude scores with each exam, which would make the correlation coefficient stronger between PI magnitude and academic performance.

Conclusion

The current study provided evidence for college freshmen students' tendency to underestimate their peers' academic self-efficacy. Although the current research failed to find support for the significant associations between the underestimation and several other variables such as academic-related behaviors, academic adjustment, and institutional attachment, the negative correlation between misestimation and academic performance was significant. That is, the more a student underestimates (overestimates) their peers' academic self-efficacy, the higher (lower) their academic performance is going to be, even when their own academic self-efficacy is controlled. This suggests that for instructors in teaching environments, it is important to correct students' overestimation of their peers' ASE due to potential factors such as perceived lack of preparedness since it might eventually lead to poor academic performance.

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Appendix A

Academic Self-Efficacy Scale (ASES) – Self Version

Directions: The following statements concern **how YOU feel** about **your** academic ability. Please click on the applicable option, using the rating scales provided.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Somewhat disagree
- 4 = Neither agree nor disagree
- 5 = Somewhat agree
- 6 = Agree
- 7 = Strongly agree

1. I am confident that I can achieve good exam results if I really put my mind to it.
2. If I don't understand an academic problem, I persevere until I do.
3. When I hear of others who have failed their exams, this makes me all the more determined to succeed.
4. I am confident that I will be adequately prepared for the exams by the time they come around.
5. I tend to put off trying to master difficult academic problems whenever they arise.*
6. No matter how hard I try, I can't seem to come to terms with many of the issues in my academic curriculum.*
7. I am convinced that I will eventually master those items on my academic course which I do not currently understand.
8. I expect to do well on tests in my classes.
 1. I fear that I may do poorly on tests.*
 2. I have no serious doubts about my own ability to perform successfully on tests.

Note: * indicates reverse-scored items

Appendix B

Academic Self-Efficacy Scale (ASES) – Other Version

Directions: The following statements concern **how YOU feel** about the **average radford student's** academic ability. Please click on the applicable option, using the rating scales provided.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Somewhat disagree
- 4 = Neither agree nor disagree
- 5 = Somewhat agree
- 6 = Agree
- 7 = Strongly agree

1. I believe the average Radford student is confident that they can achieve good exam results if they really put their mind to it.
2. If the average Radford student doesn't understand an academic problem, I believe they will persevere until they do.
3. When the average Radford student hears of others who have failed their exams, I believe this makes them all the more determined to succeed.
4. I believe the average Radford student is confident that they will be adequately prepared for the exams by the time they come around.
5. I believe the average Radford student tends to put off trying to master difficult academic problems whenever they arise.*
6. I believe no matter how hard the average Radford student tries, they can't seem to come to terms with many of the issues in their academic curriculum.*
7. I believe the average Radford student is convinced that they will eventually master those items on their academic courses which they do not currently understand.
8. I believe the average Radford student expects to do well on tests in their classes.
1. I believe the average Radford student fears that they may do poorly on tests.*
2. I believe the average Radford student has no serious doubts about their own ability to perform successfully on tests.

Note: * indicates reverse-scored items

Appendix C

Self-Efficacy for Learning and Achievement Subscale (SELAS) – Self Version

Directions: The following statements concern **how YOU feel** about **your** academic ability in your **Introduction to Psychology class**. Please click on the applicable option, using the rating scales provided.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Somewhat disagree
- 4 = Neither agree nor disagree
- 5 = Somewhat agree
- 6 = Agree
- 7 = Strongly agree

1. I believe I will receive an excellent grade in this class.
2. I'm certain I can understand the most difficult material presented in the readings for this course.
3. I'm confident I can understand the basic concepts taught in this course.
4. I'm confident I can understand the most complex material presented by the instructor in this course.
5. I'm confident I can do an excellent job on the assignments and tests in this course.
6. I expect to do well in this class.
1. I'm certain I can master the skills being taught in this class.
2. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

Appendix D

Self-Efficacy for Learning and Achievement Subscale (SELAS) – Other Version

Directions: The following statements concern **how YOU feel** about **the other students'** academic ability in your **Introductory Psychology class (PSYC 121)**. Please click on the applicable option, using the rating scales provided.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Somewhat disagree
- 4 = Neither agree nor disagree
- 5 = Somewhat agree
- 6 = Agree
- 7 = Strongly agree

1. I think the other students in this class believe they will receive excellent grades in this class.
2. I believe the other students in this class are certain they can understand the most difficult material presented in the readings for this course.
3. I believe the other students in this class are confident they can understand the basic concepts taught in this course.
4. I believe the other students in this class are confident they can understand the most complex material presented by the instructor in this course.
5. I believe the other students in this class are confident they can do an excellent job on the assignments and tests in this course.
6. I believe the other students in this class expect to do well in this class.
1. I believe the other students in this class are certain they can master the skills being taught in this class.
2. Considering the difficulty of this course, the teacher, and the other students' skills, I think the other students in this class will do well in this class.

Appendix E

Supplemental Author-Constructed Measure – Self Version

Directions: The following statements concern how **YOU feel** about **your** academic ability. Please click on the applicable option, using the rating scales provided.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Somewhat disagree
- 4 = Neither agree nor disagree
- 5 = Somewhat agree
- 6 = Agree
- 7 = Strongly agree

1. I am confident I can master content in my courses.
2. I am uncertain whether I can master the skills being taught in my classes.*
3. Most of the time, I expect to receive good grades in my classes.
4. I am confident I can have good control over my academic life.
5. I doubt my ability to satisfactorily meet future challenges here at the university.*
6. I am confident that I can remain adequately motivated throughout my college career.
7. I doubt whether I will be able to earn my college degree.*
8. I doubt I can study effectively on my own in independent/private study.*
9. I am confident I can study effectively when there are other interesting things to do.
10. I know how to schedule my time to accomplish my tasks.
11. I doubt whether I can spread out studying instead of cramming.*
12. I doubt whether I can be effective at taking notes.*
13. When I am taking a course covering a huge amount of material, I can condense my notes down to just the essential facts.
14. I'm uncertain I can do a good job on the assignments in my courses.*
15. If I try hard, I will be able to do the most difficult tasks related to my studies.
16. I am sure I can respond to questions asked by a lecturer in front of a full class.
17. I am uncertain I can ask lecturers questions about the material they are teaching during a lecture.*
18. I am uncertain whether I will ask for help if I don't understand.*
19. I am uncertain that I will complete assigned readings. *
20. I will try hard to understand difficult passages in textbooks.
21. I might not try hard enough to remember information presented in class and in textbook.*
22. When I have trouble recalling an abstract concept, I can think of a good example that will help me remember it on the test.
23. When I have to take a test on a school subject I dislike, I am confident I can find a way to motivate myself to earn a good grade.
24. When a lecture is especially boring, I doubt I can motivate myself to pay attention.*

Note: * indicated reverse-scored items

Appendix F

Supplemental Author-Constructed Measure – Other Version

Directions: The following statements concern **how YOU feel** about **the average Radford student's** academic ability. Please click on the applicable option, using the rating scales provided.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Somewhat disagree
- 4 = Neither agree nor disagree
- 5 = Somewhat agree
- 6 = Agree
- 7 = Strongly agree

1. I believe the average Radford student is confident they can master content in their courses.
2. I believe the average Radford student is uncertain whether they can master the skills being taught in their classes.*
3. I believe that, most of the time, the average Radford student expects to receive good grades in their classes.
4. I believe the average Radford student is confident they can have good control over their academic life.
5. I believe the average Radford student doubts their ability to satisfactorily meet future challenges here at the university.*
6. I believe the average Radford student is confident that they can remain adequately motivated throughout their college career.
7. I believe the average Radford student doubts whether they will be able to earn their college degree.*
8. I believe the average Radford student doubts they can study effectively on their own in independent/private study.*
9. I believe the average Radford student is confident they can study effectively when there are other interesting things to do.
10. I believe the average Radford student knows how to schedule their time to accomplish their tasks.
11. I believe the average Radford student doubts whether they can spread out studying instead of cramming.*
12. I believe the average Radford student doubts whether they can be effective at taking notes.*
13. I believe that when the average Radford student is taking a course covering a huge amount of material, they can condense their notes down to just the essential facts.
14. I believe the average Radford student is uncertain whether they can do a good job on the assignments in their courses.*
15. I believe that if the average Radford student tries hard, they will be able to do the most difficult tasks related to their studies.

16. I believe the average Radford student is sure they can respond to questions asked by a lecturer in front of a full class.
17. I believe the average Radford student is uncertain they can ask lecturers questions about the material they are teaching during a lecture.*
18. I believe the average Radford student is uncertain whether they will ask for help if they don't understand.*
19. I believe the average Radford student is uncertain whether they will complete assigned readings. *
20. I believe the average Radford student will try hard to understand difficult passages in textbooks.
21. I believe the average Radford student may not try hard enough to remember information presented in class and in textbooks.*
22. I believe that when the average Radford student has trouble recalling an abstract concept, they can think of a good example that will help them remember it on the test.
23. I believe that when the average Radford student has to take a test on a school subject they dislike, they are confident they can find a way to motivate themselves to earn a good grade.
24. I believe that when a lecture is especially boring, the average Radford student doubts whether they can motivate themselves to pay attention.*

Note: * indicated reverse-scored items

Appendix G

Marlowe–Crowne Social Desirability Scale (Crowne & Marlowe, 1960)

Directions: Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statements is true or false as it pertains to you. Please answer based on your personal opinion.

1. Before voting I thoroughly investigate the qualifications of all the candidates.
2. I never hesitate to go out of my way to help someone in trouble.
3. It is sometimes hard for me to go on with my work if I am not encouraged. *
4. I have never intensely disliked anyone.
5. On occasion I have had doubts about my ability to succeed in life. *
6. I sometimes feel resentful when I don't get my way. *
7. I am always careful about my manner of dress.
8. My table manners at home are as good as when I eat out in a restaurant.
9. If I could get into a movie without paying and be sure I was not seen I would probably do it.*
10. On a few occasions, I have given up doing something because I thought too little of my ability. *
11. I like to gossip at times.*
12. There have been times when I felt like rebelling against people in authority even though I knew they were right.*
13. No matter who I'm talking to, I'm always a good listener.
14. I can remember "playing sick" to get out of something.*
15. There have been occasions when I took advantage of someone.*
16. I'm always willing to admit it when I make a mistake.
17. I always try to practice what I preach.
18. I don't find it particularly difficult to get along with loud mouthed, obnoxious people.
19. I sometimes try to get even rather than forgive and forget.*
20. When I don't know something I don't at all mind admitting it.
21. I am always courteous, even to people who are disagreeable.
22. At times I have really insisted on having things my own way.*
23. There have been occasions when I felt like smashing things.*
24. I would never think of letting someone else be punished for my wrongdoings.
25. I never resent being asked to return a favor. *
26. I have never been irked when people expressed ideas very different from my own.
27. I never make a long trip without checking the safety of my car.
28. There have been times when I was quite jealous of the good fortune of others. *
29. I have almost never felt the urge to tell someone off.
30. I am sometimes irritated by people who ask favors of me.*
31. I have never felt that I was punished without cause.
32. I sometimes think when people have a misfortune they only got what they deserved. *
33. I have never deliberately said something that hurt someone's feelings.

Note: * indicated reverse-scored items

Appendix H

Academic Procrastination Scale-Short Form (Self Version) (APS-S; Yockey, 2014)

Directions: The following statements concern **how YOU feel** about **your** procrastination level. Please click on the applicable option, using the rating scales provided.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Somewhat disagree
- 4 = Neither agree nor disagree
- 5 = Somewhat agree
- 6 = Agree
- 7 = Strongly agree

1. I put off projects until the last minute.
2. I know I should work on schoolwork, but I just don't do it.
3. I get distracted by other, more fun, things when I am supposed to work on schoolwork.
4. When given an assignment, I usually put it away and forget about it until it is almost due.
5. I frequently find myself putting important deadlines off.

Appendix I

Academic Procrastination Scale-Short Form (Other version) (APS-S; Yockey, 2014)

Directions: The following statements concern **how YOU feel** about **the average Radford student's** procrastination level. Please click on the applicable option, using the rating scales provided.

- 1 = Strongly disagree
- 2 = Disagree
- 3 = Somewhat disagree
- 4 = Neither agree nor disagree
- 5 = Somewhat agree
- 6 = Agree
- 7 = Strongly agree

1. I believe the average Radford student puts off projects until the last minute.
2. I believe the average Radford student knows they should work on schoolwork, but I just don't do it.
3. I believe the average Radford student gets distracted by other, more fun, things when they are supposed to work on schoolwork.
4. When given an assignment, I believe the average Radford student usually puts it away and forget about it until it is almost due.
5. I believe the average Radford student frequently finds themselves putting important deadlines off.

Appendix J

Student Adaptation to College Questionnaire (SACQ) (Baker & Siryk, 1989)

Directions: The following statements concern your experiences in college. Using the scales provided, indicate how much each statement applies to you.

1 = Does Not Apply To Me At All

2

3

4

5

6

7

8

9 = Applies Very Closely To Me

1. I feel that I fit in well as part of the college environment.
2. I have been feeling tense or nervous lately.*
3. I have been keeping up to date on my academic work.
4. I am meeting as many people, and making as many friends as I would like at college.
5. I know why I'm in college and what I want out of it.
6. I am finding academic work at college difficult.*
7. Lately, I have been feeling blue and moody a lot.*
8. I am very involved with social activities in college.
9. I am adjusting well to college.
10. I have not been functioning well during examinations.*
11. I have felt tired much of the time lately.*
12. Being on my own, taking responsibility for myself, has not been easy.*
13. I am satisfied with the level at which I am performing academically.
14. I have had informal, personal contacts with college professors.
15. I am pleased now about my decision to go to college.
16. I am pleased now about my decision to attend this college in particular.
17. I'm not working as hard as I should at my course work.*
18. I have several close social ties at college.
19. My academic goals and purposes are well defined.
20. I haven't been able to control my emotions very well lately.*
21. I'm not really smart enough for academic work I am expected to be doing now.*
22. Lonesomeness for home is a source of difficulty for me now.*
23. Getting a college degree is very important for me.
24. My appetite has been good lately.
25. I haven't been very efficient in the use of study time lately.*
26. I enjoy living in a college dormitory. (Please omit if you do not live in a dormitory; any university housing should be regarded as a dormitory.)
27. I enjoy writing papers for courses.
28. I have been having a lot of headaches lately.*
29. I really haven't had much motivation for studying lately.*

30. I am satisfied with the extracurricular activities available at college.
31. I've given a lot of thought lately to whether I should ask for help from the Psychological/Counseling Services Center or from a psychotherapist outside of college.*
32. Lately, I have been having doubts regarding the value of a college education.*
33. I am getting along very well with my roommates(s) at college. (Please omit if you do not have a roommate.)
34. I wish I were at another college or university.
35. I've put on (or lost) too much weight recently.*
36. I am satisfied with the number and variety of courses available at college.
37. I feel that I have enough social skills to get along well in the college setting.
38. I have been getting angry too easily lately.*
39. Recently I have had trouble concentrating when I try to study.*
40. I haven't been sleeping very well.*
41. I'm not doing well enough academically for the amount of work I put in.*
42. I am having difficulty feeling at ease with other people at college.*
43. I am satisfied with the quality or the caliber of courses available at college.
44. I am attending classes regularly.
45. Sometimes my thinking gets muddled up too easily.*
46. I am satisfied with the extent to which I am participating in social activities at college.
47. I expect to stay at this college for a bachelor's degree.
48. I haven't been mixing too well with the opposite sex lately.*
49. I worry a lot about my college expenses.*
50. I am enjoying my academic work at college.
51. I have been feeling lonely a lot at college lately.*
52. I am having a lot trouble getting started on homework assignments.*
53. I feel I have good control over my life situation at college.
54. I am satisfied with my program of courses for this semester/quarter.
55. I have been feeling in good health lately.
56. I feel I am very different from other students at college in ways that I don't like.*
57. On balance, I would rather be home than here.*
58. Most of the things I am interested in are not related to any of my course work at college.*
59. Lately I have been giving a lot of thought to transferring to another college.
60. Lately I have been giving a lot thought to dropping out of college altogether and for good.*
61. I find myself giving considerable thought to taking time off from college and finishing later.*
62. I am very satisfied with the professors I have now in my courses.
63. I have some good friends or acquaintances at college with whom I can talk about any problems I may have.
64. I am experiencing a lot of difficulty coping with the stresses imposed upon me in college.*
65. I am quite satisfied with my social life at college.
66. I'm quite satisfied with my academic situation at college

67. I feel confident that I will be able to deal in a satisfactory manner with future challenges here at college.

Note: * indicated reverse-scored items

Appendix K

Academic Behaviors

Directions: The following questions ask about different aspects of your classroom and study habits from this past semester.

1. How many times so far have you been to your instructors' (or your TAs') office hours for all of your classes this semester?
2. How many times so far have you studied with tutors or TAs for all of your classes this semester?
3. How many times so far have you studied with your study group(s) for all of your classes this semester?
4. How often do you participate (e.g., answering questions or asking questions) in classes on average?
 - 1.Never
 - 2.Sometimes
 - 3.About half the time
 - 4.Most of the time
 - 5.Always
5. How many hours per week do you spend studying for all of your classes on average?
6. How many hours did you spend studying for all of your classes last week?
7. How many times have you been to the Academic Success Center or met with a success mentor this semester?
8. How many times have you been to or utilized resources from the Harvey Learning Center this semester?
9. How many classes did you miss this semester?
10. How many assignments did you submit late or not at all this semester?
11. How many exams did you take late or not at all this semester?
12. How much effort did you put into your academic work this semester?
 - 1.Very little
 - 2.
 - 3.
 - 4.
 - 5.
 - 6.
 - 7.
 - 8.
 - 9.A Great Deal

Appendix L

Consent Form

Title of Research: College Student Study Behaviors Project

Researcher(s): Jeff Aspelmeier and Tiange Dai

We ask you to be in a research study designed to investigate whether students' perceptions of their own study habits and beliefs about their academic abilities influences their academic performance. Additionally, this study investigates whether the accuracy of students' perceptions of their peers' study habits and abilities influences students' academic performance. This study will be conducted in two parts. The first part takes place today. The second part will take place at the end of the semester when you will be invited to complete another online survey that includes a set of questionnaires similar to what you will complete today. If you decide to be in the study, you will be asked to complete a series of questionnaires about your academic life (including beliefs about academic abilities, approach to prioritizing work, study habits, and class participation), your perceptions of your peers' academic life (including beliefs about academic abilities and approach to prioritizing work), as well as questions about your personal background.

You will also be asked to give the researcher permission to contact the University Registrar in the spring semester to obtain your final Fall cumulative GPA, the final grade of your Introductory Psychology class, your total credit hours earned to date, and the number of credit hours you are registered for in the spring semester. You will also be asked you to give us permission to contact your Instructor for PSYC 121 to obtain the final percentage of the possible points you earned in the first semester. To obtain this information, we will ask you to provide us with your name, a code name that you generate, and your student ID number through another survey link separate from the main survey. This information will be kept separate from the other data we collect. Once we obtain your GPA and the final grade for your Introductory Psychology class, that information will be paired with your code name, and we will destroy any record connecting your name and ID number with the GPA and grade information in our possession. At no point will your name or student ID ever be connected with any of the other data we will collect from you. Approximately 400 freshmen are being recruited for this study.

This study has no more risk than you may find in daily life.

You will receive 2 credits in SONA for completing both parts of this study. You will get 1 credit for completing part 1 of the study, and if you complete second part of the study (which will also be online), you will earn 1 additional credit.

There are no direct benefits to you for being in the study.

You can choose not to be in this study. If you decide to be in this study, you may choose not to answer certain questions or not to be in certain parts of this study.

There are no costs to you for being in this study.

No IP addresses will be collected in course of data collection.

If you decide to be in this study, what you tell us will be kept private unless required by law to tell. If we present or publish the results of this study, your name will not be linked in any way to what we present.

If at any time you want to stop being in this study, you may stop being in the study without penalty or loss of benefits by contacting Tiange Dai, tdai@radford.edu or Dr. Jeff Aspelmeier, Box 6946, Department of Psychology, Radford University, Radford, VA 24142. jaspelme@radford.edu, (540) 831-5520.

If you have questions now about this study, please contact the researcher listed below before agreeing to participate in this study.

If you have any questions later, you may talk with Tiange Dai, tdai@radford.edu or Dr. Jeff Aspelmeier, Box 6946, Department of Psychology, Radford University, Radford, VA 24142. jaspelme@radford.edu, (540) 831-5520.

This study was approved by the Radford University Committee for the Review of Human Subjects Research. If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Jeanne Mekolichick, Associate Provost for Research, Faculty Success, and Strategic Initiatives. jmekolic@radford.edu, (540)831-6504.

It is your choice whether or not to be in this study. What you choose will not affect any current or future relationship with Radford University.

If you would like to take part in this study, please click the yes button below indicating your agreement for participation. This will direct you to our survey. If you decide not this study, please click the no button. This will direct you to back to the SONA homepage.

Please print off a copy of this page for your records – before proceeding.

This will serve as your proof of participating in the class project in the event you have questions about obtaining your SONA credits.

-- Yes, I have read the Informed Consent form and I would like to participate in this class project.

-- No, I would not like to participate in this class project at this time.

*** Note: We will make this question mandatory (Validation = Force Response), we will use skip logic on this so that if participants say NO they do not want to participate, they will be taken directly to an exit page (the study end of survey message that reads as follows: Thank you for considering participation in our study. You have chosen not to participate at this time. Return to SONA).

Appendix M

Instructions for Generating a Codename

Since this is a two-part study, we will need to match your data from today with the data you will provide at the end of the semester. To do this we want you to make up a code name (like a password) that only you will know. We will use that code name to match up your data from both times.

We will maintain a list of names and codenames and will be emailed so we can email your codename back to you along with the link to Time 2 Survey later in the semester. List of names and codenames that will be kept separately from the rest of your data and it will be destroyed once your participation is complete.

Please **create a study codename based on the following format:**

- **the last three letters of your best friend's first name,**
- **the two digit day of the month you were born,**
- **and the last two digits of your current phone number.**

E.g., your best friend's first name is Catrice; you were born on the 9th day of the month; and your phone number is 444-555-6666, then your codename is ice0966.

Appendix N

Demographic Information Questions

Directions: The following questions ask for some background information, which can help us understand individual differences. If there are any questions you are not comfortable answering, then you may leave them blank.

1. Is this your first semester of college? Meaning you have never attended college before, not even community college.
 - a. Yes, this is my first semester of college
 - b. No, I have attended college before
2. What is your current age (in years)?
3. What is your ethnicity?
 - a. Caucasian/European American/White
 - b. African American
 - c. East-/Southeast-Asian American
 - d. Pacific-Islander American
 - e. South-Asian American (e.g., from India, Pakistan, Burma, Nepal, etc.)
 - f. Middle-Eastern/North-African American
 - g. Hispanic, Latino/a, Chicano/a American
 - h. Caribbean American
 - i. American Indian/Native American
 - j. Multi-Ethnic
 - i. You selected Multi-Ethnic as your ethnicity. Please list your ethnic identities.
 - k. Other
 - i. You selected Other as your ethnicity. Please describe your ethnic status.
4. Please indicate your current relationship status:
 - a. Single
 - b. Dating but not cohabitating (living together)
 - c. Dating and cohabitating (living together)
 - d. Married
 - e. Separated
 - f. Divorced
 - g. Widowed
5. Please indicate the educational status of your mother:
 - a. Did not complete High School
 - b. Completed High School
 - c. Attended a 2 year College (community college) but did not graduate
 - d. Completed a 2 year College Degree (Associate's Degree)
 - e. Attended a 4 year College but did not graduate
 - f. Completed a 4 year Graduate Degree (Bachelor's Degree)
 - g. Earned a Post Graduate Degree (e.g., master's or doctoral degree)
 - h. I do not know
6. Please indicate the educational status of your father:

- a. Did not complete High School
 - b. Completed High School
 - c. Attended a 2 year College (community college) but did not graduate
 - d. Completed a 2 year College Degree (Associate's Degree)
 - e. Attended a 4 year College but did not graduate
 - f. Completed a 4 year Graduate Degree (Bachelor's Degree)
 - g. Earned a Post Graduate Degree (e.g., master's or doctoral degree)
 - h. I do not know
7. Please indicate the highest educational status attained by any of your older siblings:
- a. Did not complete High School
 - b. Completed High School
 - c. Attended a 2 year College (community college) but did not graduate
 - d. Completed a 2 year College Degree (Associate's Degree)
 - e. Attended a 4 year College but did not graduate
 - f. Completed a 4 year Graduate Degree (Bachelor's Degree)
 - g. Earned a Post Graduate Degree (e.g., master's or doctoral degree)
 - h. I do not know
 - i. I don't have older siblings
8. Which best describes the type of place you lived while growing up?
- a. A large city (population over 300,000)
 - b. A small city (population about 100,000 to 300,000)
 - c. A suburb, small town, or rural area
 - d. Military
9. While growing up, what was your highest household income?
- a. Less than 29,000/year
 - b. 30,000-49,000/year
 - c. 50,000-69,000/year
 - d. 70,000 or more/year
 - e. Don't know
10. Which gender do you most closely identify with?
- a. Male
 - b. Female
 - c. Additional gender identity
 - a. You selected Additional gender identity for the gender you most closely identify with. How do you describe your gender?
 - d. Prefer not to disclose

Appendix O

End of Survey Message (Time One)

You have completed today's portion of the study.

Thank you for your time.

Remember that you will receive an email in early November to complete the second portion of the study. That part of the study will also be online, and you will complete a set of procedures that a similar to what you did today.

In the meantime, If you have any questions, concerns, complaints about your participation, you may contact Dr. Jeff Aspelmeier, Box 6946, Department of Psychology, Radford University, Radford, VA 24142. jaspelme@radford.edu, (540) 831-5520.

If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Jeanne Mekolichick, Associate Provost for Research, Faculty Success, and Strategic Initiatives. jmekolic@radford.edu, (540)831-6504.

Again, thank you for your time.

Appendix P

End of Survey Message (Time Two)

Debriefing and Thanks

Thank you for participating in this research study. This study investigated whether students' perception of their peers' study habits influences students' academic performance. Previous research has shown that people's beliefs of their academic abilities associate with their academic performance. Previous research also has shown people's inaccurate judgment and perception of the group majority's attitudes. We expect that misjudgment of the majority attitudes would result in changes in one's academic behaviors, as well as their academic performance.

Please remember that this is an ongoing class project and that the quality of our results depends on people knowing very little about the project when they participate. Please do not discuss the procedures we use here with other people who may be eligible to participate.

If you have any questions, concerns, or complaints about your participation, you may contact any of the individuals listed below:

Tiange Dai, Department of Psychology, Radford University, Radford, VA,
tdai@radford.edu

Dr. Jeff Aspelmeier, Box 6946, Department of Psychology, Radford University, Radford,
VA 24142. jaspelme@radford.edu, (540) 831-5520.

If you have questions or concerns about your rights as a research subject or have complaints about this study, you should contact Dr. Jeanne Mekolichick, Associate Provost for Research, Faculty Success, and Strategic Initiatives. jmekolic@radford.edu, (540)831-6504.

Again, thank you for your participation.

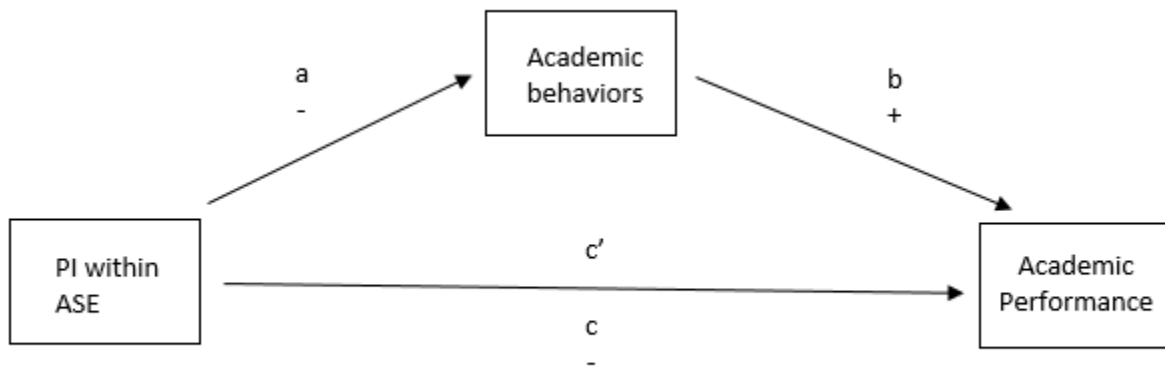
Please print this page for your records.

Return to SONA

Appendix Q

Figure 1

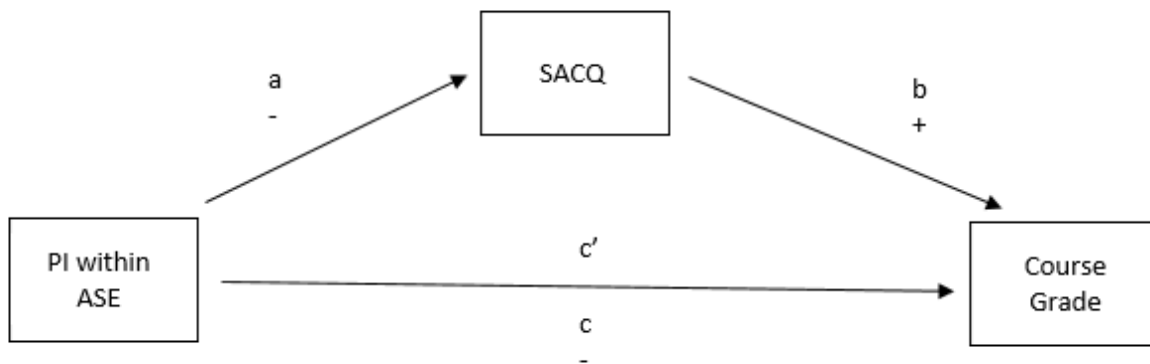
Model of Relationship Between PI Within ASE and Academic Performance Mediated by Academic Behaviors



Note. PI within ASE is expected to be negatively correlated with academic performance. This negative relationship is expected to be mediated by academic behaviors.

Figure 2

Model of Relationship Between PI Within ASE and Academic Performance Mediated by Academic Adjustment and Institution Attachment

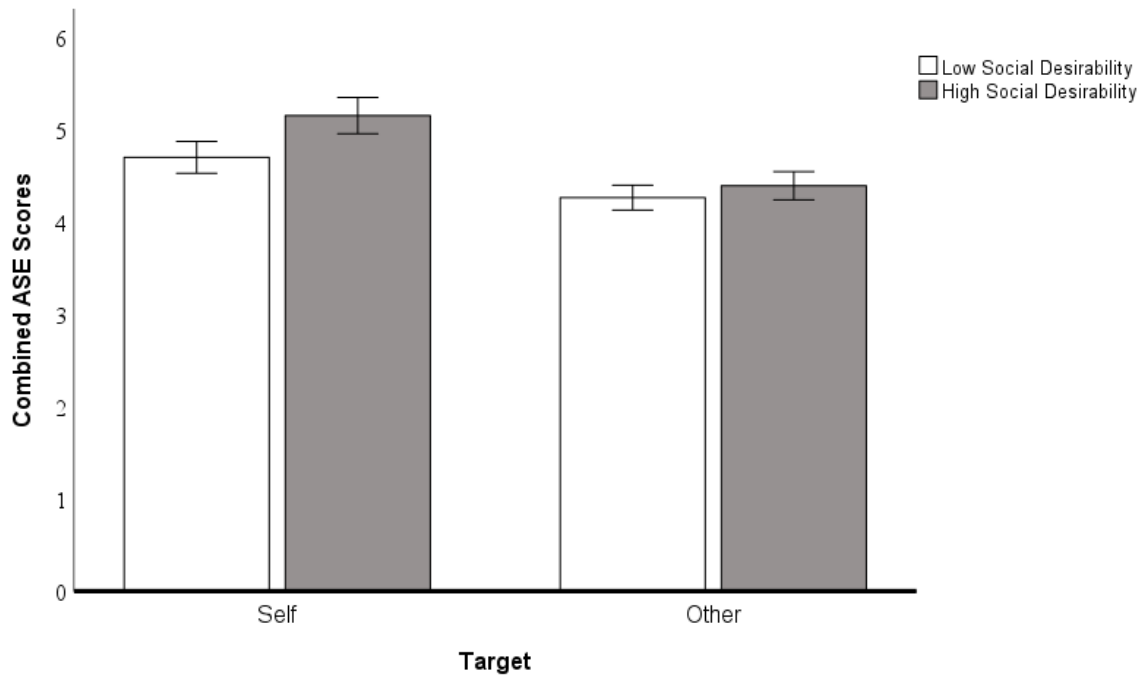


Note. PI within ASE is expected to be negatively correlated with academic performance. This negative relationship is expected to be mediated by academic adjustment and institution attachment.

Figure 3

Bar Graph of 2 (Target: Self & Other) by 2 (Social Desirability: Low & High) Mixed Model

ANOVA for Combined ASE During Time One



Note. Error bars stand for 95% confidence interval.

Appendix R

Table 1

Combined Academic Self-Efficacy Scale Factor Loadings for Principal Component Analysis for a Single Factor Solution During Time One

	Self		Others' Attitudes	
	Factor Loadings	Communalities	Factor Loadings	Communalities
ASES	.94	.88	.90	.80
SACM	.94	.88	.90	.80
Eigen Value	1.76		1.60	
<i>M</i>	4.89		4.29	
<i>SD</i>	.72		.50	
<i>r</i>	.76		.60	

Note. ASES – Academic Self-Efficacy Scale; SACM – Supplemental Author-Constructed Measure

Table 2

Combined Academic Self-Efficacy Scale Factor Loadings for Principal Component Analysis for a Single Factor Solution During Time Two

	Self		Others' Attitudes	
	Factor Loadings	Communalities	Factor Loadings	Communalities
ASES	.96	.92	.95	.91
SACM	.96	.92	.95	.91
Eigen Value	1.83		1.82	
<i>M</i>	4.85		4.25	
<i>SD</i>	.94		.96	
<i>r</i>	.83		.82	

Note. ASES – Academic Self-Efficacy Scale; SACM – Supplemental Author-Constructed Measure

Table 3*Correlations and Descriptive Data for Time Two Variables and End-of-Semester Academic Performance Variables*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. SELAS-Self (Time 1)	.89																
2. SELAS-Other (Time 1)	.50***	.90															
3. Combined ASE-Self (Time 1)	.73***	.31**	.85														
4. Combined ASE-Other (Time 1)	.46***	.56***	.53***	.92													
5. SELAS-Self (Time 2)	.25	.10	.21	-.16	.96												
6. SELAS-Other (Time 2)	.12	.48***	.31*	.37*	.40**	.93											
7. Combined ASE-Self (Time 2)	.28	.06	.57***	.25	.57***	.48**	.95										
8. Combined ASE-Other (Time 2)	-.08	.21	.13	.39**	.17	.72***	.50***	.92									
9. PI within SELAS (Time 1)	.01	.87***	-.06	.39***	-.05	.37**	-.14	.24	---								
10. PI within Combined ASE (Time 1)	.07	.46***	-.02	.84***	-.32*	.14	-.17	.32*	.49***	---							
11. PI within SELAS (Time 2)	-.04	.38**	.18	.39**	-.05	.88***	.23	.68***	.45**	.35*	---						
12. PI within Combined ASE (Time 2)	-.18	.21	-.08	.32*	-.03	.59***	.13	.93***	.34*	.44**	.67***	---					
13. Academic Adjustment	.30*	-.04	.51***	.11	.51***	.26	.83***	.18	-.24	-.28*	.03	-.15	.94				
14. Institutional Attachment	.19	-.09	.41**	.11	.40**	.21	.72***	.16	-.22	-.18	.04	-.12	.73***	.90			
15. Academic Behaviors Z Scores	.12	.04	.29	.17	.27	.36*	.43***	.19	-.02	-.00	.26	.04	.50***	.29	.68		
16. Introductory Psychology Percentage Grade	.27**	.01	.21*	-.16	.66***	.24	.33*	-.05	-.14	-.32**	-.06	-.18	.45**	.17	.23	---	
17. First semester GPA	.13	-.04	.17	-.22*	.53***	.12	.39**	-.16	-.12	-.37*	-.07	-.33*	.53***	.33*	.29	.81***	---

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Mean	5.39	5.07	4.90	4.32	5.31	4.84	4.85	4.25	-.31	-.57	-.50	-.52	6.08	6.24	.00	86.69	3.20
SD	.79	.82	.69	.51	1.25	.98	.94	.69	.82	.51	.98	.69	1.41	1.52	.46	10.39	.82
<i>n</i>	101	101	101	101	44	44	44	44	101	101	44	44	44	44	44	44	44

Note. * = $p \leq .05$, ** = $p \leq .01$, *** = $p \leq .00$. Degrees of freedom is 42 for all analyses. Cronbach's alpha are displayed on the

diagonal. SELAS = Self-Efficacy for Learning and Achievement sub-scale. ASE = Academic Self-Efficacy. Higher scores indicated higher levels of academic self-efficacy. Academic, Social, Personal and Emotional, and Institutional Adjustments are sub-scales from Students' Adjustment to College Questionnaire (SACQ).

Table 4*Association Between Mother Education and Main Variables of Interest*

	Mother Education							<i>F</i>	<i>df</i>	η^2
	Did not Complete High School (n = 4)	Completed High School (n = 14)	Attended 2 Year Community College But Did not Graduate (n = 3)	Attended 2 Year Community College and Graduate (n = 4)	Completed 4 Year Bachelor Degree (n = 12)	Earned Post- Bachelor Degree (n = 5)	Other (n = 2)			
Time Two Combined Academic Self- Efficacy (Self)	5.56 _b (.64)	5.24 _b (.87)	4.51 _{ab} (.60)	4.79 _{ab} (1.28)	4.70 _{ab} (.80)	4.45 _{ab} (.78)	3.20 _a (.98)	2.47*	(6, 37)	.29
Institutional Attachment	7.47 _b (1.17)	6.72 _b (1.28)	6.24 _{ab} (.73)	6.12 _{ab} (1.53)	6.14 _{ab} (1.65)	5.49 _{ab} (1.01)	3.10 _a (.71)	2.90*	(6, 37)	.32

Note. * = $p \leq .05$. Standard deviations appear in parentheses below mean. Means within rows with differing subscripts are significantly different at the $p \leq .05$ level, using Fisher's Post Hoc LSD tests.

Table 5*The Effects of Target (Self vs. Other) and Time (Early Semester vs. Late Semester) on SELAS*

Effect	<i>SS</i>	<i>df</i>	<i>F</i>	<i>p</i>	η^2_{partial}
Target (Self vs. Other)	7.47	1	9.39	.004	.18
Error for Target	34.17	43			
Time	.82	1	.90	.347	.02
Error for Time	38.98	43			
Interaction	.14	1	.39	.534	.01
Error for Interaction	15.58	43			

Note. SELAS = Self-Efficacy for Learning and Achievement Sub-scale.

Table 6

The Effects of Target (Self vs. Other) and Time (Early Semester vs. Late Semester) on Combined

Academic Self-Efficacy

Effect	SS	df	F	p	η^2_{partial}
Target (Self vs. Other)	15.85	1	35.48	.000	.45
Error for Target	19.20	43			
Time	.09	1	.20	.657	.01
Error for Time	19.04	43			
Interaction	.00	1	.01	.930	.00
Error for Interaction	4.68	43			

Table 7

The Effects of Target (Self vs. Other) and Social Desirability (High vs. Low) on SELAS and

Combined ASE During Time One

Effect	SS	df	F	p	η^2_{partial}
SELAS					
Target (Self vs. Other)	5.57	1	17.58	.000	.15
Social Desirability (High vs. Low)	1.58	1	1.65	.203	.02
Interaction	.97	1	3.06	.083	.03
Error for Target	31.34	99			
Error for Social Desirability	95.33	99			
Combined ASE					
Target (Self vs. Other)	17.79	1	103.35	.000	.51
Social Desirability (High vs. Low)	4.22	1	8.08	.005	.08
Interaction	1.30	1	7.54	.007	.07
Error for Target	17.04	99			
Error for Social Desirability	51.64	99			

Note. SELAS = Self-Efficacy for Learning and Achievement Sub-scale. ASE = Academic Self-Efficacy.

Table 8

The Effects of Target (Self vs. Other) and Social Desirability (High vs. Low) on SELAS and

Combined ASE During Time Two

Effect	SS	df	F	p	η^2_{partial}
SELAS					
Target (Self vs. Other)	4.67	1	6.04	.018	.13
Social Desirability (High vs. Low)	1.13	1	.64	.428	.02
Interaction	.59	1	.76	.388	.02
Error for Target	32.48	42			
Error for Social Desirability	73.77	42			
Combined ASE					
Target (Self vs. Other)	7.93	1	21.72	.000	.34
Social Desirability (High vs. Low)	.05	1	.05	.827	.00
Interaction	.14	1	.37	.546	.01
Error for Target	15.33	42			
Error for Social Desirability	43.41	42			

Note. SELAS = Self-Efficacy for Learning and Achievement Sub-scale. ASE = Academic Self-Efficacy.