WHEN IT COMES TO TEST TAKING,
IS A POSITIVE OUTLOOK TOO OPTIMISTIC?

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This investigation examines the relationship between optimism, self-efficacy, and test score predictions, postdictions, and actual test performance. Optimism, a positive outlook toward the future, has been correlated with several positive behavioral and psychological outcomes. However, in some settings this positive outlook may lead to less desirable outcomes, for example, overconfidence on an exam. Alternatively, self-efficacy, believing one is capable of achieving a goal, has been linked with increased effort toward a task. Examining optimism and self-efficacy is important in relation to test taking as being overly optimistic about performance on an upcoming exam may lead to overconfidence in predictions of scores. Self-efficacy may lead to greater accuracy of test score predictions. In this investigation, students enrolled in an educational psychology course completed a measure of optimism, a self-efficacy scale, predicted test performance, completed the exam, and post-dicted scores on that exam. Results indicated a relationship between optimism and self-efficacy, and higher self-efficacy was related to higher exam scores. Bias on test score pre and post-dictions was also related to exam scores. Optimism and self-efficacy did not relate to overconfidence in exam score predictions or post-dictions. Surprisingly, students who kept self-efficacy consistent throughout the semester scored higher on the final exam compared to students’ whose level of self-efficacy changed from the start to the end of the semester.
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CHAPTER 1

INTRODUCTION

This study examines aspects of a positive orientation, which includes optimism and self-efficacy. A positive orientation toward academics is the focus of this study and relationships between student’s positive outlook toward the future, self-efficacy for a course, and confidence of responses on an exam compared to actual performance are of importance. Students who have a higher level of optimism may overestimate what they believe they will score on a test. Put differently, higher levels of optimism may lead students to believe a more positive outcome will occur compared to the actual score on a test. Alternatively, students with a higher level of self-efficacy may be less likely to overestimate their scores on an exam, because these students may not simply believe a positive outcome will occur as is the case with optimism. Instead, students with higher levels of self-efficacy believe they can and have engaged in the behaviors necessary to reach a certain outcome, in this case a score on an exam.

Benefits of having an optimistic outlook have been demonstrated by several studies. The benefits range from physical and mental to general achievement (Scheier & Carver, 1985; Scheier, Carver & Bridges, 1994). Dispositional optimism has been defined as an overall outlook that event outcomes will be positive (Carver, Scheier, & Segerstrom, 2010; Scheier & Carver, 1985; Scheier, Michael F., Carver, 1993). Put differently, dispositional optimism is a general expectancy for positive events to happen in the future.
Although positive outcomes have been associated with general optimism, being optimistic about specific event outcomes may lead to unrealistic expectations (Armor & Taylor, 1998). For example, having an optimistic outlook toward academics may lead students to have expectations for success and make inaccurate judgments of their own learning because they believe they can retrieve more information than what they actually can.

Whereas optimism is related to future outcomes, it is an outcome expectancy, self-efficacy is the belief that one can engage in the necessary behaviors to reach the desired goal and therefore is an efficacy expectation (Bandura 1977). Self-efficacy was defined by Bandura (1976) as “judgments of…capabilities to organize and execute course of action required to attain designated types of performances…[and] is concerned with the judgments of what one can do with what one possesses.” (p 391). Self-efficacy is related to the effort one directs toward an activity as well as the length of time one exerts such effort toward the task. Self-efficacy is clearly related to goal setting and motivation. An individual with a specific goal in mind may be more likely to expend effort to reach that goal based on how motivated to accomplish the goal he or she may be. Efficacy expectancies can change based on the goal and situation. Weaker expectations for success may lead to less effort toward the goal because one deems the goal to be too difficult to achieve. Stronger expectations for success may result in one putting forth greater effort toward achieving the goal (Bandura, 1977). Self-efficacy is therefore related to the outcome of goal-directed behaviors.
There appears to be a gap in the research specifically linking optimism to self-efficacy. Optimism is considered an outcome expectancy and self-efficacy is an efficacy expectation. Zimmerman (2000) examined outcome expectations and self-efficacy related to motivation and hypothesized that self-efficacy would have a larger role in motivation because the outcome of a specific event is related to whether or not one believes they will be successful in the activity. According to Schunk (1989), simply because a student has an expectation that an outcome will be positive for a learning task, does not mean the student is truly learning the information (p 175). A student with higher levels of optimism may not engage in the behaviors needed to reach the optimistic expectation. For example, on a spelling test, students who expect to be given positive feedback for scoring well (positive outcome expectancy) may not engage in the behaviors needed to actually score as well as originally thought (efficacy expectancy). (Schunk, 1989).

Statement of the Problem

Students who have higher levels of optimism may overestimate how many questions they believe they will answer correctly compared to students with lower levels of optimism. Self-efficacy, however, may lead to less bias in pre and post-diction of exam scores. Levels of self-efficacy may change over time as students become more familiar with exam formats, leading to more accurate predictions and post-dictions of test scores.
Purpose and Significance

The purpose of the study is to differentiate optimism from self-efficacy and determine which leads to more accurate exam performance predictions. Students with higher than appropriate optimism may not score as well as they believe they will because they may not actually carry out the needed behaviors toward a specific goal. Self-efficacy may mean students make more accurate predictions and postdictions of test scores compared to optimistic students because self-efficacious students believe they have the necessary skills to accomplish their goal.

Research Questions

1. What is the relationship between optimism and self-efficacy?
2. Does optimism lead to more bias in test score prediction and post-diction compared to self-efficacy?
3. Does the relationship of optimism or self-efficacy with predicted and post-diction of test performance change over time?

Hypotheses

1. Optimism and self-efficacy will positively correlate.
2. Higher levels of optimism will lead to greater bias in prediction and post-diction of test scores compared to self-efficacy.
3. Self-efficacy will lead to increased accuracy over time in predictions and post-dictions of test scores.
Definition of Terms

Optimism: Positive outlook toward future events (Scheier & Carver, 1985)

Self-efficacy: Belief that one can successfully engage in necessary behaviors to reach a goal (Bandura, 1977)
CHAPTER 2
LITERATURE REVIEW

Overview

Both optimism and self-efficacy have been linked to positive orientation (Oles, Alessandri, Oles, Bak, Jankowski, Laguna, & Caprara, 2013). Having a positive orientation includes feeling an overall satisfaction with life and is related to coping skills, goal setting, and higher self-esteem. These relate to how people function on a daily basis and one’s overall well-being. Because optimism and self-efficacy are part of having a positive orientation, it is important to examine the relationship between the two and investigate how they influence people in specific environments and situations such as school and academic tasks.

Optimism

Optimism has been defined in terms of one’s outlook on future events (Scheier & Carver, 1985). Having a general positive outlook has been labeled general optimism or dispositional optimism. General optimism has extraordinary benefits in regard to one’s well-being. For example general optimism has been implicated in having a positive impact on rate of healing after surgery (Scheier, Matthews, Owens, Magovern, Lefebrve, Abbott, & Carver, 1989). Participants in one study underwent coronary artery bypass surgery and then were given a measure of general optimism. Results indicated that a higher level of optimism was linked to faster rate of healing (Scheier et al., 1989). Optimistic individuals in a different study believed they were less likely to experience
negative life events such as health related issues than would be anticipated for their age and demographics (Rothman, Klein, & Weinstein, 1996).

In a study conducted by Chang, Bodem, Sanna, & Fabian (2011), general optimism was also demonstrated to influence how long students worked on a challenging task. Students with a higher level of optimism were more likely to continue working on a challenging task even when the task was difficult compared to students with a lower level of optimism. According to Huan, Yeo, Ang, and Chong (2006), a relationship between general optimism and academic stress exists. Students with a positive outlook toward the future reported that they experienced less stress related to school.

Siddique, LaSalle-Ricci, Glass, Arnkoff, and Diaz (2006) examined whether first year law students with a more positive outlook expected to have a higher level of academic performance compared to students with a more negative outlook. Results indicated that a higher level of optimism was related to higher expectations of final exam scores. However, there was not an indication that optimism was related to actual academic performance. Chemers, Hu, and Garcia (2001), on the other hand, demonstrated that optimism did correlate with academic performance. Students with a higher level of optimism scored higher on the measures of academic achievement.

Because general optimism is an expectation that future outcomes will be positive, it can be considered an outcome expectancy. Such outcome expectancies have been paired with self-efficacy as indicators of certain results (Brown, et al, 2014).
Self-Efficacy

Bandura (1977) suggested that self-efficacy is the belief that a desired goal can be achieved and the necessary behaviors needed in order to reach the goal can be successfully initiated. Self-efficacy beliefs can influence the amount of effort and persistence applied to a task (Bandura, 1977; 1982a). One who has high self-efficacy for an activity is more likely to put larger amounts of effort and continue to work on the task even when it becomes challenging.

Influences on self-efficacy are performance accomplishments, vicarious experiences, verbal persuasion, and emotional arousal (Bandura, 1977). Performance accomplishments include past performance on a task. Successful completion of a task may influence self-efficacy differently than unsuccessful completion of the task (Feltz, 1982), which may also predict one’s future performance (Bandura, 1982A; Locke, Frederick, Lee, & Bobko, 1984).

Self-efficacy is one component of the self-regulation process. Self-regulation of behavior and controlling one’s behavior involves both successful and unsuccessful experiences and the feedback one receives after such experiences (Bandura, 1971). Behavior is controlled, in part, by one’s level of self-efficacy for a specific task. One who believes they are capable of successfully completing a task is more likely to engage in the task compared to one who does not believe the task can be completed successfully. It has also been suggested that self-efficacy acts as a moderator between the feedback one receives on a task and the behaviors in which one employs after receiving the feedback as the feedback one receives may cause an increase in effort in individuals with higher
self-efficacy (Nease, Mudgett, & Quinones, 1999). Actions such as increasing effort after receiving feedback, then, could influence actual performance on the task. The opposite could also be true for someone with lower self-efficacy. Receiving repeated negative feedback on a task could encourage decreased effort on the task and potentially lower task performance.

According to Zimmerman’s (1989) model of self-regulated learning, self-motivation beliefs coupled with an analysis of the task at hand influence self-regulation behaviors. Self-motivation and task analysis occur before one begins to solve a problem and influence the strategies one chooses to utilize during problem solving. Additionally, self-efficacy and outcome expectancies are involved in self-motivation (Zimmerman, 1989). Thus self-efficacy and an outcome expectancy such as optimism, could influence the self-regulatory behaviors of students. In turn, these behaviors can also influence the academic performance of students. Locke, Frederick, Lee & Bobko (1984) found that there are direct and indirect influences of self-efficacy on performance through goal setting, using self-efficacy as a predictor of performance on a given task. Similar results were found by VandeWalle, Cron, & Slocum (2001) when self-efficacy positively influenced goal setting and performance. Support exists for the impact of self-efficacy on course grade as a measure of academic performance as well (Phillips & Gully, 1997). Shores & Shannon (2007) found a significant relationship between self-efficacy and math performance in fifth and sixth grade students. Self-efficacy was found to significantly contribute to students’ math exam scores and overall course grade (p 232). Students with higher self-efficacy were more likely to earn higher scores on the math exam. Students
may overestimate how well they think they will do on an exam. Stone (1994) examined self-efficacy and whether participants overestimate performance. Results of the study indicate an overconfidence effect in that participants gave a self-efficacy judgment that was higher than the actual performance on a computer based task.

Self-efficacy can also influence behavior, one’s choice of activities, coping with success and failure, and efficacy expectations, which is the belief that one can engage in behaviors that would lead to a certain outcome. An efficacy expectation differs from an outcome expectation because one can believe an outcome could happen but may not believe he/she is capable of successfully engaging in the behaviors needed to reach the desired outcome (Bandura, 1977). The difference between an efficacy expectation and an outcome expectation is what differentiates self-efficacy from optimism. Students may have high optimism, believing that positive outcomes can happen in the future. However, the student could have low self-efficacy for a specific task, which means he/she may not believe they are capable of being successful at the immediate task.

**Overconfidence**

Both optimism and self-efficacy may lead to incorrect perceptions of the outcomes of future events and performance on a task, which is considered overconfidence. This overconfidence occurs when “judged probabilities tend to exceed proportions correct” (Yates, Lee, Sieck, Choi, & Price, 2002, p 271). Bias is defined as the measurement of the extent of over or under confidence (Yates, et al., 2002). According to Armor and Taylor (2002), people have the tendency to make predictions of performance that are biased toward overconfidence and thus overly optimistic. Examples
of overconfidence are seen in various arenas including investing, risk-taking, and education.

In a study conducted by Weinstein and Klein (2002), participants were asked to compare the likelihood of certain events, such as a heart attack, happening to them with the likelihood of those events happening to other people of similar demographics. Results from the study indicated that participants were biased toward the events that were not likely to occur to them (p 315).

Research in the field of education suggests that students are often overconfident in their predictions of exam and course performance. Sheppard, Ouellette, Fernandez (1996) found that when exam is in the distant future, students have expectations for a higher grade compared to their actual performance on the test. Grimes (2002) and Grimes, Millea, and Woodruff (2004) found that students in introductory economics courses exhibited overconfidence in terms of exam grades expected. Additionally, Nowell and Alston (2007) found that one third of participants in their study displayed optimistic bias in predicting their course grade in an economics course. Hacker, Bol, Horgan, Rakow (2000) examined test score prediction related to performance. Results indicated that “greater accuracy in prediction can help students either avoid premature termination or avoid prolonged duration of study, thereby helping with the management of time and effort” (p 160). Results also suggested that students who had an optimistic bias in predicting test scores were optimistically biased in post-diction of their scores.

Pulford and Colman (1997) conducted a study examining over- and under-confident judgments of performance of undergraduate and graduate students on hard,
medium, and easy questions. The performance task was to answer questions from the board game Trivial Pursuit, which tests general knowledge on a variety of subjects. Participants were asked a question and given time to write down their answer as well as their confidence in their answer being correct on a scale between 0% (“no confidence”) to 100% (“total confidence”) (p 129). Results from this study indicate that hard questions lead to a higher level of overconfidence compared to the medium and easy questions.

Optimism and self-efficacy, although connected, are conceptually different and may impact students differently. Being highly optimistic about the event outcome (overconfidence) may lead students to not put forth time and effort into studying for an exam. This then may mean the actual performance on the exam does not match the students expected outcome. Having a high level of self-efficacy for a task means one believes in their capability to successfully complete the task. However, high self-efficacy may also lead to overconfidence in which one’s expected performance on the task does not match actual performance. Because self-efficacy involves goal setting, motivation, and behaviors, it may be more useful for students to be efficacious for a task compared to students who are more optimistic and have less self-efficacy.
CHAPTER 3

METHODOLOGY

Participants

Participants for this study were identified from students enrolled in an introduction to educational psychology course at a large university. Subjects were given course credit for participation. Approximately 75% of participants were female, and the total number of participants was 366. This particular group of participants was chosen to participate in the study because of the importance of having participants with a similar background knowledge in the course content so that the exams could be standardized over the course of several semesters.

Instrumentation

Optimism. The Life Orientation Test (LOT) (Scheier & Carver, 1985) is a measure of one’s overall outlook on future events compared to a pessimistic outlook. This is used to measure optimism. There are 12 items, each using a Likert-scale response from 1 (strongly agree) to 5 (strongly disagree). Four filler items are included on the scale that are not counted during scoring. Three items are reverse scored. Total optimism is calculated by adding up the response scores.

Self-Efficacy. The Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1991) includes a subscale to measure self-efficacy. The MSLQ is a scale developed to measure two overarching domains of motivation and learning strategies. The scale is comprised of 81 items, each with a 7-point Likert scale from 1 (not at all true of me) to 7 (very true of me). Some items are
to be reverse scored before calculating the total score. To determine a total score for each subscale, scores on each item are summed. Each of the two main components of the MSLQ are divided into subscales. The motivation portion of the scale includes subscales that measure self-efficacy for learning and performance, intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs, and test anxiety. The learning strategies set of scales includes rehearsal, elaboration, organization, critical thinking, metacognitive self-regulation, time and study environment management, effort regulation, peer learning, and help seeking. For the purposes of this study, only the self-efficacy scale will be analyzed which includes items 5, 6, 12, 15, 20, 21, 29, and 31 on the Motivation section of the MSLQ.

**Test Predictions and Postdictions.** Students were first asked to predict the percentage correct from 0 to 100 they believed they would earn on the exam. The first exam was 35 multiple choice questions, and the final exam was 100 multiple choice questions. When participants were finished with the exam, they were asked to write down the percentage they believed they earned on the test. The over or under confidence of students for the exam was indicated by a bias score. These scores were calculated by taking the predicted percentage on the exam and subtracting the actual score on the test. Therefore, each exam has a bias score for before the test and a bias score for after the test.

**Data Collection and Analysis**

Collection of data took place during fall 2003, spring and fall 2004, spring and fall 2005, and spring 2006. Data were collected during the 15 week semester long course. The professor of the course collected survey data online using the LOT and
MSLQ at the start of the semester, predictions and post-dictions for each exam including the final exam, and surveyed students using the MSLQ again at the end of the semester.

To analyze the data, descriptive statistics, including the mean, standard deviation, and range for each variable in the study were first produced. Normality of data was also investigated using skewness and kurtosis statistics. In order to examine the relationship between optimism and self-efficacy, correlation between variables were analyzed using the total score from the Life Orientation Test, the self-efficacy at the start of the semester, and the end of the semester self-efficacy score. Correlations of the change in self-efficacy from start to end of the semester, first exam scores, final exam scores, and bias indicator before and after the test were analyzed to determine whether they are related.

Next, multiple regression analysis was conducted to determine the extent to which optimism and self-efficacy predict test scores and led to bias in test score prediction. Test scores from the first exam were entered as the dependent variable with optimism as the first independent variable and self-efficacy at the start of the semester as the second independent variable. Data output was examined for significance of the model as well as the contribution of each predictor variable to the model. The same method was used to examine optimism, self-efficacy, and final exam scores. Linear regression was conducted with final exam scores as the dependent variable and optimism and self-efficacy as independent variables, and the results were analyzed for significance and variance explained in the dependent variable by the independent variables.

A third regression was run to evaluate the impact of optimism and self-efficacy on bias in test score prediction. Bias before the exam was entered as the dependent variable,
and optimism and self-efficacy were entered as independent variables. Bias after the exam was entered as the dependent variable in another regression, again with optimism and self-efficacy as predictor variables. Change in self-efficacy was entered as an independent variable and bias before the exam was entered as the outcome variable in a separate regression to determine how self-efficacy changing over time could potentially impact score prediction bias.

Mediation analysis was also conducted to examine possible effects of self-efficacy on the relationship of optimism to final exam scores. This analysis included linear regression using optimism as the predictor variable with final exam scores as the dependent variable. Regression analysis was also conducted with optimism as the predictor of self-efficacy (dependent variable), and regression was again conducted using self-efficacy as the independent variable with the final exam score as the dependent variable. The Sobel Test for mediation analysis was used to calculate the mediation model changes.

Change in self-efficacy was examined further by splitting participants into four groups based on how much their self-efficacy changed from the start of the semester to the end of the semester. The groups of change in self-efficacy were compared with one another to see which groups increased or decreased in self-efficacy. These groups were also compared with the final exam score as a measure of achievement in the course to investigate for possible impact of change in self-efficacy on academic achievement.
CHAPTER 4

RESULTS

The purpose of this investigation was to investigate optimism and self-efficacy related to their role in academic performance. This study was designed to explore the bias students have when predicting and post-dicting test scores, and the potential impact optimism and self-efficacy may have on such bias. Participants from an introductory educational psychology course were used in data collection. Higher scores on the MSLQ Self-efficacy for Learning and Performance indicate higher levels of self-efficacy for success in the course. Mean, standard deviation, and number of participants for each variable are included in Table 1. Normality of data using skewness and kurtosis are also represented in Table 1. Skewness statistics close to 0 indicate a normal distribution of data, and kurtosis values of 0 indicate normal tail length on the distribution. Negative skewness is indicative of a distribution with lower scores on the measure, and negative kurtosis indicates a longer tail on the left side of the distribution.

Research Question One

What is the relationship between optimism and self-efficacy?

To establish whether optimism and self-efficacy relate, correlation analysis was conducted. Bivariate correlation analysis was used and indicated multiple significant and positive relationships between variables as well as some significant and negative relationships. The results of this analysis are listed in Table 2. Two-tailed significance was used so as to not make assumptions regarding the direction of the relationships.
before analysis. Given the suggested guidelines from Cohen (1988), correlations above .10 can be described as low, above .30 are moderate, and .50 and above are high in terms of effect size.

Table 1. *Descriptive Statistics*

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>N</th>
<th>Skewness</th>
<th>Kurtosis</th>
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<tr>
<td>Optimism</td>
<td>27.72</td>
<td>5.61</td>
<td>200</td>
<td>-.54</td>
<td>.18</td>
</tr>
<tr>
<td>Self-efficacy (pre)</td>
<td>67.86</td>
<td>6.91</td>
<td>330</td>
<td>-.52</td>
<td>.13</td>
</tr>
<tr>
<td>Self-efficacy (post)</td>
<td>70.77</td>
<td>6.59</td>
<td>325</td>
<td>-.64</td>
<td>.13</td>
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<tr>
<td>Change in SE</td>
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<td>6.75</td>
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<td>.19</td>
<td>3.28</td>
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<td>First Exam</td>
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<td>5.07</td>
<td>444</td>
<td>-.59</td>
<td>-.19</td>
</tr>
<tr>
<td>First Exam Bias (pre)</td>
<td>7.39</td>
<td>12.56</td>
<td>435</td>
<td>.24</td>
<td>.62</td>
</tr>
<tr>
<td>First Exam Bias (post)</td>
<td>6.39</td>
<td>10.90</td>
<td>432</td>
<td>.03</td>
<td>.36</td>
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<tr>
<td>Final Exam</td>
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<td>12.43</td>
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<td>-.60</td>
<td>.50</td>
</tr>
<tr>
<td>Final Exam Bias (pre)</td>
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<td>11.57</td>
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<td>.10</td>
<td>1.31</td>
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<tr>
<td>Final Exam Bias (post)</td>
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<td>12.00</td>
<td>388</td>
<td>-.31</td>
<td>6.00</td>
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<tr>
<td>Sum of all exams</td>
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<td>47.22</td>
<td>358</td>
<td>.48</td>
<td>.17</td>
</tr>
</tbody>
</table>

Based on the correlations, optimism and self-efficacy positively and significantly correlated at the start of the semester and at the end of the semester. Optimism and start of the semester showed a moderate correlation, and optimism with end of the semester self-efficacy had low correlation. Because of these correlations, support for the hypothesis that the two variables would relate is confirmed.
Research Question Two

Does optimism lead to more bias in test score prediction and post-diction compared to self-efficacy?

All of the exam scores for the semester were summed to create a total exam score variable. To examine the impact of optimism and self-efficacy on total exam score, multiple regression analysis was conducted. The combination of optimism, start of the semester self-efficacy, and end of the semester self-efficacy (F(2,95) = .42, p = .66) with R² of .01 meaning that optimism and self-efficacy explained one percent of the variance in total exam scores for the semester.

To further examine whether optimism and self-efficacy predict exam scores, linear regressions were conducted for the first test of the semester. Initial results of the analysis indicate that together optimism and self-efficacy were significant predictors of scores on the first test (F(2, 195) = 6.38, p < .01) with R² of .06. However, optimism did not contribute to the model (β = .10, p = .89). Self-efficacy at the start of the semester was a significant predictor of scores on the first exam (β = .25, p < .01). These results suggest that self-efficacy influences exam scores toward the beginning of the semester, but optimism does not. Collinearity was examined to ensure that optimism and self-efficacy were not overlapping in their impact exam scores. Variance inflation factors (VIF) were 1.28 for optimism and 1.29 for self-efficacy. Because these are lower numbers on a scale of 1 to 10, collinearity is not an issue as Cohen, Cohen, West, and Aiken (2003) suggest a VIF of greater than ten indicates collinearity issues. The finding that optimism was not a significant predictor of performance does not support the
hypothesis that optimism and self-efficacy positively and significantly relate to test
scores. However, self-efficacy was a significant predictor, which provides partial support
for the hypothesis.

Final exam scores were examined through multiple regression analysis with
regard to their relationship to optimism and self-efficacy. In the model \( F(2, 199) =
9.11, p < .01 \), optimism \( (\beta = .11, p = .14) \) and self-efficacy \( (\beta = .233, p < .01) \) together
were shown to be predictors of final exam scores and explained 9% of the variance in
scores. Although optimism significantly and positively correlated with final exam scores,
it was not a significant predictor of exam performance. However, self-efficacy was a
significant predictor of exam scores, which provides partial support for the hypothesis
that optimism and self-efficacy will relate to performance.

Mediation analysis was conducted based on Baron and Kenny (1986). Regression
analysis was conducted with optimism as the predictor variable of final exam scores \( F(1,199) = 7.71, p < .01 \), and then optimism as the predictor of self-efficacy \( F(1, 199) =
29.53, p < .01 \). A third regression was conducted using self-efficacy as the predictor of
final exam score \( F(1, 325) = 26.69, p < .01 \). Multiple regression analysis conducted
with optimism and self-efficacy was previously completed \( F(2, 199) = 9.11, p < .01 \).

Using Preacher (2016) and the Sobel Test calculation, the indirect effect of optimism on
final exam scores through self-efficacy was determined \( z = 3.73, p < .01 \). Partial
mediation of self-efficacy was evident through an attenuated relationship of optimism
and final exam scores since this test result was significant (Figure 1).
Table 2. *Correlations*

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
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<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOT</td>
<td>1</td>
<td>.36**</td>
<td>.29**</td>
<td>-0.06</td>
<td>.09</td>
<td>.08</td>
<td>.03</td>
<td>.19**</td>
<td>.02</td>
<td>-0.02</td>
<td>.10</td>
</tr>
<tr>
<td>Pre-MSLQ</td>
<td>1</td>
<td>.50**</td>
<td>-0.54**</td>
<td>.30**</td>
<td>-0.04</td>
<td>-0.02</td>
<td>.28**</td>
<td>-0.03</td>
<td>.04</td>
<td>.22**</td>
<td></td>
</tr>
<tr>
<td>Post-MSLQ</td>
<td>1</td>
<td>.46**</td>
<td>.41**</td>
<td>-0.21**</td>
<td>-0.15**</td>
<td>.46**</td>
<td>-0.12*</td>
<td>-0.04</td>
<td>.26**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change SE</td>
<td>1</td>
<td>.12</td>
<td>-0.17**</td>
<td>-0.15*</td>
<td>.17**</td>
<td>-0.09</td>
<td>-0.10</td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Exam</td>
<td>1</td>
<td>-0.80**</td>
<td>-0.69**</td>
<td>.61**</td>
<td>-0.25**</td>
<td>-0.19**</td>
<td>.30**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Bias (Pre)</td>
<td>1</td>
<td>.84**</td>
<td>-0.42**</td>
<td>.22**</td>
<td>.22**</td>
<td>-.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>First Bias (Post)</td>
<td>1</td>
<td>-0.35**</td>
<td>.25**</td>
<td>.27**</td>
<td>-.09</td>
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<tr>
<td>Final Exam</td>
<td>1</td>
<td>-0.63**</td>
<td>-0.50**</td>
<td>.70**</td>
<td></td>
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<tr>
<td>Final Bias (Pre)</td>
<td>1</td>
<td>.75**</td>
<td>-.47**</td>
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<tr>
<td>Final Bias (Post)</td>
<td>1</td>
<td>-.30**</td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Sum of Scores</td>
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</table>

**p < .01,  *p < .05**
Investigating optimism and self-efficacy’s impact on pre and post-diction bias was done through linear regression for the first exam of the semester and the final exam. For the first exam of the semester, optimism and self-efficacy were not contributors to bias before the exam (F(2,192) = .01, \( p = .99 \)), and after the exam (F(2,191) = .20, \( p = .82 \)). Neither optimism nor self-efficacy predicted bias on the first exam. For the final exam score predictions, optimism and self-efficacy were not significant predictors of bias (F(2,191) = .25, \( p = .78 \)). Bias after the exam was not predicted by optimism and self-efficacy (F(2, 190) = .19, \( p = .82 \)). These results for the first exam of the semester and the final exam do not support the hypothesis that optimism and self-efficacy influence bias in test score pre and post-dictions.

**Research Question Three**

Does the relationship of optimism or self-efficacy with predicted and post-diction of test performance change over time?

Based on the initial correlation analysis, optimism and self-efficacy did not significantly correlate with bias on any of the exams, indicating a lack of support for the hypothesis that optimism and self-efficacy will influence pre and post-dictions of test scores. Optimism and the first exam predictions did not correlate, and similar results were found for the post-dictions on that test. Consistent results were found with optimism and final exam predictions and post-dictions. Self-efficacy also did not correlate with predictions on the first exam, and self-efficacy was not correlated with post-dictions. Similar results were found between self-efficacy and final exam score predictions and post-dictions.
Figure 1. Mediation
Table 3. *Change in Self-efficacy*

<table>
<thead>
<tr>
<th>Change in Self-Efficacy</th>
<th>M</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>-4.67</td>
<td>4.60</td>
<td>86</td>
</tr>
<tr>
<td>Group 2</td>
<td>.91</td>
<td>.81</td>
<td>68</td>
</tr>
<tr>
<td>Group 3</td>
<td>4.16</td>
<td>.85</td>
<td>75</td>
</tr>
<tr>
<td>Group 4</td>
<td>10.29</td>
<td>5.02</td>
<td>93</td>
</tr>
</tbody>
</table>

Change in self-efficacy was calculated by taking the self-efficacy score at the end of the semester and subtracting the self-efficacy score from the start of the semester. A positive number indicated that self-efficacy increased from the beginning to end of the course, whereas a negative number indicated that self-efficacy decreased over the 15 weeks. Change in self-efficacy over time was investigated in greater detail through splitting participants into four groups based on the change in self-efficacy value.

Differences between groups were significant (F(3, 357) = 5.12, p < .01). Final exam scores were also put into groups with significant differences between groups (F(3, 410) = 5.48, p < .01). Results indicated that performance changed as self-efficacy changed for three out of four groups of students with group one decreasing in self-efficacy, group two stayed the most consistent, group three increased, and group four increased more than group three according to Table 3. These groups were compared to both the final exam score and the sum of scores on all exams in the class through post hoc testing. Students whose level of self-efficacy remained consistent tended to score the highest on the final exam. Students whose self-efficacy decreased over the course of the semester tended to
score lower on the exam compared to the group that was most consistent. Students with the highest increase in self-efficacy on average, tended to score the lowest on the final exam. Mean and standard deviation of each change in self-efficacy group score on the final exam are reported in Table 4, and 100 points were possible on the exam.

Table 4. *Final Exam Scores*

<table>
<thead>
<tr>
<th>Change in Self-Efficacy</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>68.74</td>
<td>11.56</td>
</tr>
<tr>
<td>Group 2</td>
<td>75.73</td>
<td>11.63</td>
</tr>
<tr>
<td>Group 3</td>
<td>74.36</td>
<td>10.55</td>
</tr>
<tr>
<td>Group 4</td>
<td>72.52</td>
<td>12.66</td>
</tr>
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</table>
CHAPTER 5

DISCUSSION AND CONCLUSIONS

Overview

This study was designed to determine the relationship between a positive outlook and confidence in one’s abilities and their potential impact on student achievement since optimism and self-efficacy have been linked to a positive orientation. Another aim of the investigation was to examine to what extent optimism and self-efficacy influence the confidence of students in their test score predictions and postdictions. Change in self-efficacy over time was also of importance to the goals of the study in investigating its influence on over or under confidence in predictions of exam scores.

Conceptually, optimism and self-efficacy can be described in different terms with optimism as an outcome expectancy and self-efficacy as an efficacy expectancy. However, according to Oles, Alessandri, Oles, Bak, Jankowski, Laguna & Caprara (2013), both optimism and self-efficacy fall under the umbrella of a positive orientation, and both optimism and self-efficacy have been linked to success in various fields. Optimism has been linked to decreased healing time (Scheier et. al, 1989) and perseverance when faced with a challenging academic task (Chang, Bodem, Sanna, & Fabien, 2011). There have also been studies linking optimism to expectations for success on academic tasks (Siddique, LaSalle-Ricci, Glass, Arnkoff, and Diaz, 2006). However, studies of optimism’s possible direct impact on academic achievement have been lacking. Self-efficacy, on the other hand, has been linked repeatedly to academic performance and successful completion of tasks (Locke, Frederick, Lee & Bobko, 1984;
VandeWalle, Cron, & Slocum, 2001). Self-efficacy and optimism as an outcome expectancy have been described in terms of the behaviors involved in reaching a certain goal that one feels is necessary to reach the desired result.

Because optimism and self-efficacy are both expectancies and part of a positive orientation, it was hypothesized that they would positively correlate so that as level of optimism increases, one’s confidence in abilities also increases. Even though optimism and self-efficacy were thought to be related, higher levels of optimism could lead to an increase in the over confidence of exam score prediction when compared with self-efficacy. If optimism leads to greater overconfidence, then self-efficacy could lead to greater accuracy of predictions of test scores over time.

Results indicated that optimism was related to self-efficacy. As the optimism level of a student increased, so did self-efficacy. Final exam scores were positively and significantly related to optimism so that students with higher levels of optimism scored higher on the exam. However, optimism was not significantly related to actual scores on the first exam of the semester. With regard to predictions of final exam scores, optimism was a predictor of bias, meaning the higher the level of optimism, the greater the over confidence in predicted score. The post-dicted scores were not significantly influenced by optimism though.

Self-efficacy related positively and significantly to first exam scores and final exam scores. Additionally, self-efficacy was found to predict first exam scores and final exam scores, indicating that students who believe in their capabilities to perform well on the test actually perform better on the test compared to students with less confidence in
their abilities, which has also been supported in other studies of self-efficacy and test taking.

Pre and post-dictions on exams tended to be biased either over or under confident. This bias predicted test scores on both the first exam and final exam. Optimism and self-efficacy did not influence the bias students exhibited on either exam, indicating that there was not an effect on over or under confidence of optimism and self-efficacy.

Based on research on the construct of optimism, it was hypothesized that optimism would be related to exam scores and thus optimism would be shown to influence students’ achievement on tests. However, the findings suggest that optimism does not have a strong relationship with all types of exams scores. Believing that a positive outlook could happen in the future does not appear to be helpful for students in terms of exam scores at the start of a semester. This finding could be due to the generalized nature of optimism. Having an outcome expectancy for the future may not translate into actual results as one may not engage in the behaviors needed in order to actually make the expected outcome happen. This is where self-efficacy enters the picture. Because optimism and self-efficacy are related, self-efficacy may pick up where optimism leaves off. Put differently, optimism may be too broad of a construct to have an immediate impact on a specific task. A small relationship between optimism and the final exam in a class was indicated, but having an optimistic outlook toward the future was not a significant predictor of scores on the final exam. Having confidence in one’s ability to complete the task makes the difference and impacts performance on the task.
Self-efficacy changed the relationship of optimism with exam scores. Optimism and self-efficacy were both significant predictors of final exam scores. There was a mediation effect of self-efficacy on optimism with final exam scores at just below significance in which self-efficacy decreased the strength of the relationship between optimism and final exam scores. This could be due to the definition of self-efficacy and again relates back to the idea that confidence over optimism is needed to be successful on a task. The specific self-efficacy one feels toward a test is more important than an overall optimistic outlook for that exam.

The most significant finding of the study relates to change in self-efficacy over time. Students with consistent self-efficacy scores from the start to the end of the semester tended to score the highest on the final exam, suggesting a relationship between lack of change in self-efficacy and achievement. However, most students in the course tended to change in terms of their level of self-efficacy from the start to the end of the semester, with some students increasing in self-efficacy while others decreased. Those whose level of self-efficacy decreased, tended to also score lower than the group with consistent self-efficacy. Interestingly, the group of students with consistent self-efficacy did not have the highest level of self-efficacy. Students with consistent self-efficacy had the second highest level of efficacy in the class and scored the best on the final exam when compared with students whose level of self-efficacy increased or decreased significantly.
Implications

Even though optimism and self-efficacy fall under the idea of a positive orientation, they can be described as separate constructs. They are related but do not seem to overlap in terms of influence on academic performance. One could have a positive outcome expectancy for the future and not feel confident in being able to accomplish a specific task successfully. The opposite may also be true that one could be confident in abilities but not see outcomes in the future as being positive. In an academic sense, optimism did not appear to influence course performance in a significant way, whereas self-efficacy contributed significantly to test performance. Previous performance and feedback are two factors influencing self-efficacy, and these may influence the performance of students. How a student feels about their performance on the first exam in the course may influence how they feel about their capabilities on future exams in the course. The feedback a student receives after taking an exam may influence confidence in that student’s ability to perform successfully on future tests. Based on the results of this study, it is important for a student’s level of self-efficacy to remain consistent throughout a class. The first exam in the class as well as the feedback the student receives on that exam may influence changes in self-efficacy and thus influence the performance of that student in the course.

Thinking about future outcomes in a positive light may have benefits in certain areas as suggested by previous research. However, general optimism may not be beneficial for students in academic situations. Simply telling a student to think that positive things will happen does not seem to make a difference in terms of the student’s
performance in school. What does impact students, especially in an exam situation, is the self-efficacy the student has for that specific test. Students who feel confident in their ability to do well on the test would be more likely to actually score higher on the exam. This leads to implications for classroom teachers because helping students feel efficacious for a specific task may lead to a certain level of performance on the task. This performance, along with feedback the student receives may influence future levels of self-efficacy. It is important for the teacher to help the student remain efficacious throughout the course, and when possible, help the student remain at a relatively consistent level of efficacy.

**Limitations**

One possible limitation of the study is that optimism was only measured at the start of the semester. Comparisons between level of optimism at the beginning of the course and optimism at the end of the course could not be made. Because optimism and self-efficacy have been shown to be related, measuring both constructs at similar intervals could have been useful in examining how they change over time in terms of their relationship and whether any change in their relationship impacts performance. Examining changes in optimism over time related to change in self-efficacy over time. Whether optimism and self-efficacy change in a parallel nature could be investigated with both constructs measured at similar times.

Another possible limitation of the study was that the confidence ratings for both the predictions and postdictions were not measured. Obtaining confidence rating in the pre and postdictions in which students would be asked to give a predicted exam score
and a rating from 0 to 100 of confidence in receiving the predicted score. This would allow for deeper examination of the predictions students make regarding academic performance.

A third potential limitation was the self-report nature of the LOT, MSLQ, and pre and post-dictions of scores. Students predicting their scores may arbitrarily write down a percentage regardless of whether they believe in their abilities to achieve such a score. This may have led to inaccurate pre and post-dictions of scores in comparison to the actual performance on the test.

**Future Directions**

Based on the results that self-efficacy changed over time for some students but not others, and those whose self-efficacy remained relatively constant demonstrated the best performance on the two exams, it could be pertinent to examine the types of feedback students received on the tests. Studying the feedback students received and possible factors that led students to change their self-efficacy would be useful in developing suggestions for educators in how feedback is provided to students. Perhaps certain types of feedback could be more beneficial for students when preparing for an upcoming exam.

Gender differences in optimism and self-efficacy as well as gender differences in the bias in pre and post dictions of test scores were not examined as part of this study. Different results may be found for males and females on measures of optimism and measures of self-efficacy. Males and females may also differ in their over or under confidence in scoring a certain way on a test. Looking more closely at the possible
impact of gender on these constructs may be useful in understanding the relationship between optimism and self-efficacy.
APPENDICES
Appendix A

Life Orientation Test

(Scheier & Carver, 1989)

Directions: Please circle the number that best fits your agreement. Rate the degree to which you agree with each item using the following five-point continuum:

$0 = \text{strongly disagree}$
$1 = \text{disagree}$
$2 = \text{neutral}$
$3 = \text{agree}$
$4 = \text{strongly agree}$

1. In uncertain times, I usually expect the best.   0 1 2 3 4
2. It's easy for me to relax.   0 1 2 3 4
3. If something can go wrong for me it will. 0 1 2 3 4
4. I always look on the bright side of things. 0 1 2 3 4
5. I'm always optimistic about my future. 0 1 2 3 4
6. I enjoy my friends a lot. 0 1 2 3 4
7. It's important for me to keep busy. 0 1 2 3 4
8. I hardly ever expect things to go my way. 0 1 2 3 4
9. Things never work out the way I want them to. 0 1 2 3 4
10. I don't get upset too easily. 0 1 2 3 4
11. I'm a believer in the idea that "every cloud has a silver lining". 0 1 2 3 4
12. I rarely count on good things happening to me. 0 1 2 3 4
APPENDIX B

MOTIVATED STRATEGIES FOR LEARNING QUESTIONNAIRE (MSLQ)
Appendix B
Motivated Strategies for Learning Questionnaire (MSLQ)
(Pintrich, Smith, Garcia, & McKeachie, 1991)

Part A. Motivation

The following questions ask about your motivation for and attitudes about this class.

Remember there are no right or wrong answers, just answer as accurately as possible. Use the scale below to answer the questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

1 2 3 4 5 6 7

| Not at all true of me | Very true of me |

1. In a class like this, I prefer course material that really challenges me so I can learn new things.

2. If I study in appropriate ways, then I will be able to learn the material in this course.

3. When I take a test I think about how poorly I am doing compared with other students.

4. I think I will be able to use what I learn in this course in other courses.

5. I believe I will receive an excellent grade in this class.

6. I'm certain I can understand the most difficult material presented in the readings for this course.

7. Getting a good grade in this class is the most satisfying thing for me right now.

8. When I take a test I think about items on other parts of the test I can't answer.
9. It is my own fault if I don't learn the material in this course.

10. It is important for me to learn the course material in this class.

11. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.

12. I'm confident I can learn the basic concepts taught in this course.

13. If I can, I want to get better grades in this class than most of the other students.

14. When I take tests I think of the consequences of failing.

15. I'm confident I can understand the most complex material presented by the instructor in this course.

16. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.

17. I am very interested in the content area of this course.

18. If I try hard enough, then I will understand the course material.

19. I have an uneasy, upset feeling when I take an exam.

20. I'm confident I can do an excellent job on the assignments and tests in this course.

21. I expect to do well in this class.

22. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.

23. I think the course material in this class is useful for me to learn.

24. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.

25. If I don't understand the course material, it is because I didn't try hard enough.
26. I like the subject matter of this course.

27. Understanding the subject matter of this course is very important to me.

28. I feel my heart beating fast when I take an exam.

29. I'm certain I can master the skills being taught in this class.

30. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.

31. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

Part B. Learning Strategies

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<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all true of me</td>
<td>Very true of me</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

32. When I study the readings for this course, I outline the material to help me organize my thoughts.

33. During class time I often miss important points because I'm thinking of other things.

(reverse coded)

34. When studying for this course, I often try to explain the material to a classmate or friend.

35. I usually study in a place where I can concentrate on my course work.

36. When reading for this course, I make up questions to help focus my reading.

37. I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do. (reverse coded)
38. I often find myself questioning things I hear or read in this course to decide if I find them convincing.
39. When I study for this class, I practice saying the material to myself over and over.
40. Even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone. (reverse coded)
41. When I become confused about something I'm reading for this class, I go back and try to figure it out.
42. When I study for this course, I go through the readings and my class notes and try to find the most important ideas.
43. I make good use of my study time for this course.
44. If course readings are difficult to understand, I change the way I read the material.
45. I try to work with other students from this class to complete the course assignments.
46. When studying for this course, I read my class notes and the course readings over and over again.
47. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.
48. I work hard to do well in this class even if I don't like what we are doing.
49. I make simple charts, diagrams, or tables to help me organize course material.
50. When studying for this course, I often set aside time to discuss course material with a group of students from the class.
51. I treat the course material as a starting point and try to develop my own ideas about it.
52. I find it hard to stick to a study schedule. (reverse coded)
53. When I study for this class, I pull together information from different sources, such as lectures, readings, and discussions.

54. Before I study new course material thoroughly, I often skim it to see how it is organized.

55. I ask myself questions to make sure I understand the material I have been studying in this class.

56. I try to change the way I study in order to fit the course requirements and the instructor's teaching style.

57. I often find that I have been reading for this class but don't know what it was all about. (reverse coded)

58. I ask the instructor to clarify concepts I don't understand well.

59. I memorize key words to remind me of important concepts in this class.

60. When course work is difficult, I either give up or only study the easy parts. (reverse coded)

61. I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course.

62. I try to relate ideas in this subject to those in other courses whenever possible.

63. When I study for this course, I go over my class notes and make an outline of important concepts.

64. When reading for this class, I try to relate the material to what I already know.

65. I have a regular place set aside for studying.

66. I try to play around with ideas of my own related to what I am learning in this course.
67. When I study for this course, I write brief summaries of the main ideas from the readings and my class notes.

68. When I can't understand the material in this course, I ask another student in this class for help.

69. I try to understand the material in this class by making connections between the readings and the concepts from the lectures.

70. I make sure that I keep up with the weekly readings and assignments for this course.

71. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.

72. I make lists of important items for this course and memorize the lists.

73. I attend this class regularly.

74. Even when course materials are dull and uninteresting, I manage to keep working until I finish.

75. I try to identify students in this class whom I can ask for help if necessary.

76. When studying for this course I try to determine which concepts I don't understand well.

77. I often find that I don't spend very much time on this course because of other activities. (reverse coded)

78. When I study for this class, I set goals for myself in order to direct my activities in each study period.

79. If I get confused taking notes in class, I make sure I sort it out afterwards.

80. I rarely find time to review my notes or readings before an exam. (reverse coded)
81. I try to apply ideas from course readings in other class activities such as lecture and discussion.
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