

The Effects of Realistic and Unrealistic Optimism on Performance and Coping

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Abstract

Historically, optimism has been studied as a dichotomous variable. However, research has found that there are two types of optimists: cautious/realistic and unrealistic/cockeyed. A cautious/realistic optimist is defined as someone that has a good grip on reality, and a cockeyed/unrealistic optimist as someone that engages in self-delusion (Wallston, 1994). The purpose of the present study was to administer an intervention to students (N=67) to attempt to shift their perspective towards that of a cautious optimist, and to determine the effects of optimism on performance and coping. The study took place across four time points. As a whole, the intervention was not fully supported by the data, as the changes in optimism were not large enough to be statistically reliable. The data also did not support our hypothesis that level of optimism would predict a student's exam grades. Coping behaviors were assessed before and after Exam 1 and Exam 2, and were markedly different, specifically after Exam 2. Poor performance on Exam 2 was associated with behavioral disengagement and denial, whereas positive performance on Exam 1 was associated with self-encouragement and sustain coping.

The Effects of Realistic and Unrealistic Optimism on Performance and Coping

Optimism has been shown to be beneficial in a variety of different domains. It has a positive relationship with subjective well-being, positive emotions and moods, success, and health. (De ridders, Schreurs & Bensing, 2000; Schulman, 1999; Hmieleski & Baron, 2009; Segovia, Moore, Linnville & Hoyt, 2015). In the domain of health, Kenneth Wallston (2011) investigated the relationship in between optimism and psychological well being in persons with HIV/AIDS. Overall, results indicated dispositional optimism was significantly associated with psychological well being and even predicted change (Wallston, 2011). More broadly, there is a positive correlation between level of optimism and coping on a task (Marshall & Brown, 2006). When participants with low expectancies of success on a task were confronted with failure, they were found to feel worse about themselves than those who were more optimistic about their performance (Marshall & Brown, 2006). Even though the benefits of optimism have been demonstrated, it is important to note that historically it has been studied with a binary.

Optimal Margin of Illusion

Traditionally, illusions have been defined as exaggerations in self-perception (Baumeister, 1989). Colloquially, the term “illusion” tends to have a negative connotation, and there is some historical reason for this perception. Countless times throughout history, an illusion of optimism has caused people to persist uselessly at unsolvable tasks and had disastrous consequences, as previously described by Baumeister (1989). For example, the Crusades were commenced with the belief that divine favor and Christian military excellence would yield victory, yet they produced massive defeats and failures for Europe. In the case of local prophets in the Middle Ages, the large majority started with limited

goals or promises, but as they gradually gathered followers and admirers, they proceeded to make increasingly grandiose claims that resulted in the death or imprisonment of the prophet and similar consequences for his/her followers. Although illusions can be detrimental, an increase in work demonstrating the positive benefits of illusion has created some debate about this notion.

Alloy and Abramson (1979) found that most people, with the exception of those that were depressed, tended to overestimate their successes in the world. Taylor and Brown (1988) conducted a review and found that people based happiness on the subjective comparison of their circumstances against their internal standards and expectations, not on the objective judgment of circumstances. They argued that people were happy when they perceived their circumstances to be a little better than they were. In fact, in the case of victims, who can be argued to have their functioning in the world challenged, there is evidence that illusions may be helpful. Research has found that three basic assumptions are threatened in a victim (1) the world is benevolent (2) the world is meaningful and (3) the self is worthy (Janoff-Bulman, 1989). There have also been findings that non-victims tend to underestimate the likelihood of a negative event happening, thereby suggesting that these individuals are living an illusion (Janoff-Bulman, 1989).

In an effort to settle the debate of whether illusions are helpful or hurtful, Baumeister (1989) created a middle ground construct: the optimal margin of illusion. This construct is built on the idea that having a little bit of a distorted view of the world can actually be beneficial, and that if an individual does not operate within this optimal space then he/she will have a decreased ability to psychologically function. In many situations,

one's true abilities and capacities can be measured; however, this measurement may not be the same as one's subjective measurement of ability. The margin of illusion is the gap between what an individual thinks he/she can do and what he/she can actually do. If someone has a large margin of illusion then there exists a large exaggeration of one's ability, whereas a small margin of illusion indicates that the individual sees himself or herself quite accurately (Baumeister, 1989). Baumeister (1989) argues that in order to function optimally in the world, a slight distortion of one's perception of the self and the world is needed.

Although Baumeister (1989) does not explicitly discuss the role of optimism in his construct of the optimal margin of illusion, it can be inferred that the two are implicitly related. Traditionally, dispositional optimism has been defined as a belief or expectation that outcomes will prove to be favorable regardless of the specific situation (Segerstrom, 2005). However, rather recently Kenneth Wallston (1994) has expanded on previous definitions of optimism by identifying two different types of optimists: cautious optimists and cockeyed optimists. He defines cautious optimists as individuals that have a good grasp on reality. These optimists believe that things are going to work out favorably, but just to make sure, will do everything in their power to make sure that they do. On the other hand, cockeyed optimists engage in self-delusion. These optimists are so sure that everything is going to turn out favorably, that they feel no need to put in any effort into the task. Aside from approaching the task with differing mindsets, cautious and cockeyed optimists have been shown to react differently when presented with failure (Wallston, 1994). Since cautious optimists have a better grasp on reality, they are able to form a "plan b" as they are engaging in the task. They understand that things may not work out and

have thus prepared themselves for failure while still remaining positive. Since they know that failure is always a possibility, cautious optimists are better equipped to deal with failure if/when it happens. However, cockeyed optimists do not even regard failure as a possibility and can thus encounter problems when making sense of it. In the case of cautious optimists, failure does not necessarily challenge their beliefs about the world since they know that failure is always a possibility; however, the world of cockeyed optimists is greatly affected by failure and results in limited coping ability (Wallston, 1994). Cautious optimists have an illusion of optimism that proves to be adaptive, because it is just large enough of an illusion.

Appraisal Theory

According to appraisal theorists, emotions result from cognitive appraisals of a specific situation. In this way, every emotion has a certain blueprint of a pattern of appraisals that will yield it. There are two sets of appraisals, primary and secondary. Primary appraisal involves assessing the current situation to determine how it relates to one's own personal motives; secondary appraisal involves assessing the specific situation to determine ability to cope with it (Smith & Lazarus, 1990). In secondary appraisal, there are four components: accountability, problem-focused coping potential, emotion-focused coping potential and future expectancy (Smith & Lazarus, 1990). A cautious optimist would be high on the problem focused coping potential dimension, because this dimension measures one's ability to act directly in the situation and manage the demands. This type of optimist will have created a plan to handle the current situation, and will thus perceive him/her self as having enough resources to draw on that he/she will appraise problem focused coping potential as high. Furthermore, a cautious optimist will also be high in

emotion-focused coping potential, because since this type of optimist already introduced the possibility of this context, he/she also had some time to figure out an adequate response. Constructs like optimism can alter the way that we appraise certain situations and can thus result in the use of different coping mechanisms.

Margins of Illusion Applied to Academic Settings

Understanding how the constructs of the optimal margin of illusion or cautious optimism and appraisal play into the realm of academia can be incredibly useful. Svanum and Bigatti (2006) conducted a study that attempted to examine grade expectations in an abnormal psychology course. The researchers asked students to predict their final grade right after they had received the syllabus and a detailed course overview. Findings indicated that 95.5% of the students anticipated a grade of B or better, which was not reflective of the grade distribution in class. In the end, the study found that 70% of students had overestimated their actual grade by an entire letter. The results indicated that the bottom third of the class was not only relatively more optimistic in their attribution style than the top two-thirds but was also unable to reliably predict relative standing at the end of the course. Applying Baumeister's (1989) construct of the margin of illusion, one can infer that the bottom third students had too large of an illusion about their capabilities, which resulted in poor performance in the course.

The Present Study

One of the major gaps in the existing optimal margin of illusion research relates to the lack of external validity of the experiments already conducted. Aside from the field of health psychology, experiments dealing with the constructs of margins of illusion or even the power of optimism have tended to focus on testing participants in a specific lab setting

such as on a computer test or math test. Even in these studies, little attention has been paid to the distinction in between too much optimism and just enough. Historically, optimism has been studied as a dichotomous variable instead of on a continuum. In the case of emotion appraisal, research has shown that specific appraisal profiles result in specific emotions, which then affect what emotion regulation strategies are utilized (Smith & Ellsworth, 1987). The present study attempted to integrate the constructs of appraisal theory, coping and optimism to better investigate the relationship between them. Furthermore, the present study allows discussion of the constructs of the optimal margin of illusion and cautious optimism to be applied to real life contexts.

It is no secret that students can have difficulty adjusting to the academic difficulty of college their first semester. Kruger and Dunning (1999) showed that individuals who are classified as incompetent within a certain realm not only do not have the knowledge that would make them competent, but they are not able to accurately evaluate their own competency. In response to the existing gaps in the research, the present study focused on examining participants that were about to encounter a real life stressful situation: taking exams in the first semester of their college career. The aim of the present study was to examine if college students could be manipulated to approach real tests in their classes with cautious optimism, and if performance as well as coping improved as a result. The present study could provide the information needed to create a sort of mental toolbox for students so that they could be successful in college right from the beginning. Furthermore, if our hypotheses were supported, then this toolbox could lead students to engage in more effective coping mechanisms thereby diminishing stress.

Vanderbilt University is a prestigious institution and is currently ranked 16th in the United States (US News and World Reports, 2016). As a result, admission is very competitive with the 2015 acceptance rate being at an all-time low of 9.5% (US News and World Reports, 2016). Oftentimes, the students that enroll in this university were at the top of their class, enrolled in extracurricular activities and taking a very challenging course load in high school. For many, it is the first place where they cannot just “coast” through assignments and rely on their IQ to get good grades. For this reason, the students at Vanderbilt University were ideal for testing the ideas of cautious optimism and its benefits. The reported mid 50% range ACT scores for the incoming class of 2015 was 30-34 compared to the 20-21 that is the average score nationwide (US News and World Reports, 2016). For many of the students that enter, Vanderbilt is the first place they are not automatically regarded as the top of their class. The present study utilized a four time-point design with time-point 1 being administered prior to the first test as well as the second test and time-point 2 being administered each time after the exam grades were released for the first and second exam. The following hypotheses and question were examined:

Hypothesis 1: Across time-points, the realistic optimism scores of the students exposed to the optimism intervention will increase relative to the control group, who will not receive the intervention.

Hypothesis 2: Test performance can be predicted from the level of optimism and students who exhibit higher levels of realistic optimism will have higher exam grades.

Hypothesis 3: The group scores for realistic optimism for the intervention group will be higher than for the control group

Hypothesis 4: The level of optimism will determine the margin of error between predicted grades and actual grades

Research Question: What coping behaviors are associated with more realistic optimism?

Methods

Study Design

The present study was a randomized controlled study with two conditions: intervention and control. The primary dependent variables were performance and coping. The study was administered across four time points.

Time point 1: Participants were instructed to come into the lab for this time point to familiarize them with the setup of the survey. Participants recorded their age and gender and were randomly assigned to the control group or the intervention group during this session. They were then asked to complete a battery of tests on the computer. Among the measures included, and of particular interest for this study were: Lot-R Optimism Scale, Constructive Thinking Inventory Naïve Optimism Scale, Optimism Bias Scale and the designed Intervention. If the participant was in the control group, then they were not administered the intervention. Participants were given a time span of five days ending a day before their first Introduction to Psychology exam to complete this survey.

Time point 2: After exam grades for the first exam were posted, participants were emailed a link with an online survey that contained a battery of tests including the Constructive Thinking Inventory and COPE¹.

¹ It was intended that both the Lot-R and Optimism Bias Scales would be measured at time-points 2 and 4, however, these measures were not administered at these time-points due to a clerical error.

The students were given five days to complete this link from the day that they received their exam grades.

Time point 3: Same as Time point 1, only with regard to the second examination.

Time point 4: Same as Time point 2, only with regard to the second examination.

Procedure

A trained experimenter obtained informed consent from participants during the first time point, prior to participating in the study. The experimenter instructed participant to read and sign the consent form, which described different aspects of the study. The participants were given the choice of refusing to participate at any point during the study and were given a chance to ask questions. Consenting participants consequently entered a survey battery lasting about 40 minutes during time point 1. At subsequent time points, they were emailed with directions and a link to the survey batteries.

Participants

Seventy-five undergraduate students were recruited from the Introduction to Psychology course at Vanderbilt University. However, due to participants failing to complete all surveys, our final sample consisted of 67 participants. The participants were randomly assigned either the intervention condition (n=30, 46.67% female) or the control condition (n=37, 56.76% female). Participants were required to be 18 years of age or older (Mean=18.84, SD=0.931). They participated in the experiment in exchange for course credit.

Measures

The *Life Orientation Test-R Optimism Scale* (Carver, Scheier, Segerstrom 2010) was created to be a bidirectional scale containing optimism and pessimism (Cronback's alpha=0.82).

This was intended to be a measure of realistic optimism-higher the scores the higher the level of optimism. The items were rated on a Likert scale from 1 “Strongly Disagree” to 7 “Strongly Agree”. There are 10 subscale items with 4 items acting as fillers. Examples of subscale items included “In uncertain times, I usually expect the best”. See Appendix A for the full scale. These sub scales were administered at Timepoints 1 and 3.

The *Constructive Thinking Inventory Naïve Optimism* (Epstein & Meier 1989) scale was designed to assess gross overgeneralization following positive outcomes, and thus was used as a measure of unrealistic optimism. It is a 10-item sub scale in the Constructive Thinking Inventory scale (Cronbach’s $\alpha=0.67$). Every scale was derived from a factor analysis of data gathered on people’s everyday automatic thinking. The items were rated on a Likert scale from 1 “Strongly Disagree” to “Strongly Agree”. An example of an item is, “When I discover someone I like a lot likes me, it makes me feel like a wonderful person and that I can accomplish whatever I want to”. See Appendix B. These sub scales were administered at Timepoints 1, 2, 3, 4.

The *Optimism Bias General* scale (Howard 2011) was developed in an effort to test the planning fallacy in students, which is the tendency for students to overestimate the amount of work they can complete in short periods of time or their ability to rebound (Cronbach’s $\alpha=0.68$). Higher levels of unrealistic optimism are indicated with higher scores on this 10-item subscale. The items were rated on a Likert scale from 1 “Strongly Disagree” to 7 “Strongly Agree”. An example of an item is, “I expect to complete personal projects in less time than it actually takes to complete them”. See Appendix C. This subscale was administered at Timepoints 1 and 3.

The *COPE* scale (Carver et al., 1989) was designed to assess 25 different methods of coping. The students were instructed to rate the items on a Likert scale from 1 "Strongly Disagree" to 9 "Extremely Agree" with the exam in mind. The scale was administered at each timepoint, with timepoints 1 and 3 reflecting coping behaviors prior to the exam and timepoints 2 and 4 reflecting coping behaviors to their exam scores. The scale was expanded from its original version in an effort to truly capture coping behaviors the participants engaged in. The twenty-five behaviors were acceptance, behavioral disengagement, denial, express, understand, help cope, information seeking, persevere cope, physical disengagement, plan, reprioritize, ruminate, savor cope, social support, self accountability, self-encouragement, self isolation, self restraint, stoicism, suppression, sustain coping, religion, humor, drugs and wishful thinking. See Appendix D.

The *Intervention* designed to increase levels of cautious optimism was presented as a study skills workshop in the present study. It was created with the intention of generating the following characteristics of a cautious optimist in students: having a plan B, having adequate knowledge of resources, having accurate knowledge of strengths and weaknesses, having a general plan, really understanding the risks and benefits of the situation one is in and having confidence in one's ability. For example, for the items focusing on accurate awareness of resources, students were required to type in resources such as professor's office hours, TA's office hours, campus resources, extra credit etc. Another important emphasis was creating a global and localized plan to achieve the student's goal. The students were instructed to generate a study plan based off of their realistic social, academic and personal obligations. Were they going to study in groups? By reviewing notecards? For how long before the exam? When? These types of questions

allowed the students to theoretically design a study plan best personalized to their needs and goals. At the global level, the students were instructed to think about the possibility of failing to meet their present exam score. If they did not score as highly as they thought they were going to, how would they recover from that to meet their overall grade of the course? Another crucial component was ensuring that the student was aware of his/her weaknesses as well as strengths. The participants were instructed to think back on past classes and what mistakes they had made. Did they struggle with completing homework? Taking notes? Then they were instructed to consider what approaches had resulted in positive outcomes for them in prior classes. Overall, there were ten questions were structured as free-write responses to a series of questions in order to maximize personalization and create an environment in which the students could engage with the task. See Appendix E.

Materials

All of the above measures were compiled into two sets of surveys administered through REDCap electronic data capture tools hosted at Vanderbilt University. REDCap (Research Electronic Data Capture) is a secure, web-based application designed to support data capture for research studies, providing: 1) an intuitive interface for validated data entry; 2) audit trails for tracking data manipulation and export procedures; 3) automated export procedures for seamless data downloads to common statistical packages; and 4) procedures for importing data from external sources.

Results

Descriptive Statistics

The means of both exam 1 and 2 are depicted in Table 1 along with the expectation scores given by participants. As seen in previous studies, students predicted significantly higher exam grades than they received for exam 1 ($t(66)=10.831, p<0.001$) and exam 2 ($t(54)=6.135, p<0.001$).

	Min %	Max %	Mean %	Std. Dev
Actual Grade Exam 1	55	93.1	79.1372	8.56176
Expectation Grade Exam 1	83	97	90.34	4.464
Actual Grade Exam 2	57	94.7	80.9873	7.57633
Expectation Grade Exam 2	77	97	87.8421	4.71998

Hypothesis 1: Across time-points, the realistic optimism scores of the students exposed to the optimism intervention, not the control group, will increase.

For this analysis, we ran a mixed model time by intervention-type ANOVA for each of the three optimism measures (CTI at all four timepoints, LOT at timepoint 1 and timepoint 3 and OB at timepoint 1 and timepoint 3). We predicted an increase in realistic optimism in the intervention group, but not the control group. Contrary to the original hypothesis there was not a significant Constructive Thinking Inventory timepoint X intervention interaction [$F(1,51)=0.120, p=ns$], not a significant LOT- timepoint X intervention interaction [$F(1,54)=0.386, p=ns$], and not a significant OB-timepoint X intervention interaction [$F(1,55)=0.88, p=ns$].

Hypothesis 2: Test performance can be predicted from the level of optimism and there will be a positive relationship between students who exhibit higher levels of realistic optimism and higher exam grades.

For this analysis, a correlational analysis was done with the optimism measure (CTI, LOT and OBS) independent of the intervention and the exam grade at time-points 2 and 4 (Correlation Table 5). The Lot-R and the CTI were positively correlated with one another ($r=0.244, p<0.05$), but neither was significantly correlated with the OB scale. It was surprising that the CTI and the OB scale were not correlated, as they were both included to measure unrealistic optimism. Contrary to the original hypothesis, the first exam grade was not significantly correlated with any of the optimism measures (LOT-R, $r=0.154, p=ns$) (CTI-R, $r=0.114, p=ns$) (OBS, $r=-0.012, p=ns$). Similarly, the second exam grade also showed no relationship with the optimism measures (OBS, $r=-0.094, p=ns$) (CTI, $r=-0.070, p=ns$) with one exception: the Lot-R ($r=-0.325, p<0.05$). The negative relationship between the Lot at timepoint 3 and the second exam was not expected, as we expected students with high levels of dispositional optimism to score higher on the exam. A bizarre finding was that the scores on Exam 1 and Exam 2 were not correlated with one another ($r=-0.48, p=ns$).

Correlation Table 5.

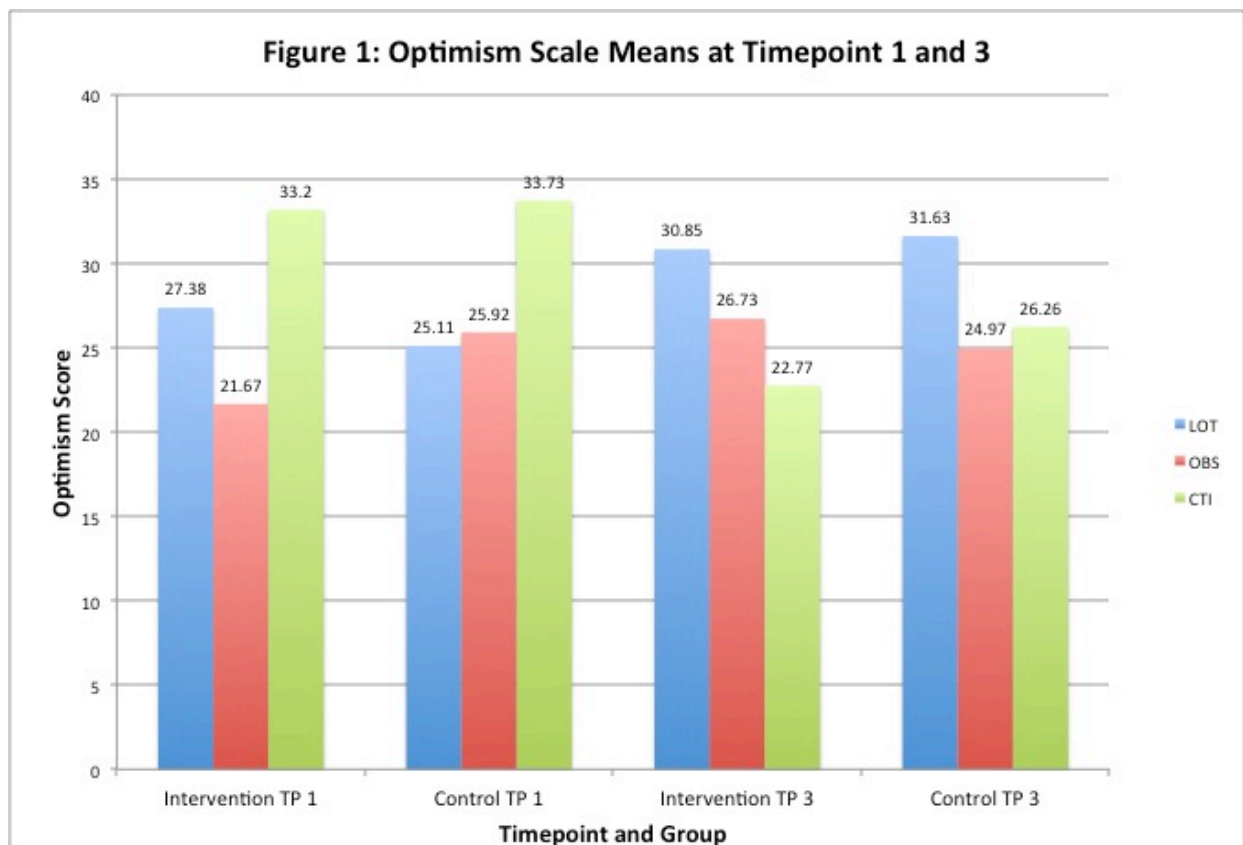
	Lot TP1	CTI TP1	Ob TP1	Grade Exam 1	Grade Exam 2	Lot TP3	CTI TP3	OBG TP3
LOTTP1 Pearson Correlation Sig. (2-tailed) N	1 67	.244* .047 67	-.12 0.923 67	.154 .213 67	-.093 0.500 55	740** 0.000 56	.384** 0.003 56	.221 0.098 57
CTITP1 Pearson Correlation Sig. (2-tailed)			.110 .374	-.195 .114	-.024 0.862	.186 .171	.681** 0.00	-0.002 0.989

	N		67	67	55	56	56	57
OBTP1	Pearson Correlation			-.147	-.039	-.224	-.002	.630**
	Sig. (2-tailed)			.236	.776	0.097	.987	0.000
	N		67	55	56	56	56	57
Gradeexam1	Pearson Correlation			-.048	.229	.011		-.180
	Sig. (2-tailed)			.727	.089	.935		.179
	N			55	56	56		57
Gradeexam2	Pearson Correlation					-.288*	-.070	-.073
	Sig. (2-tailed)					.035	.614	.597
	N					54	54	55
LOT-TP3	Pearson Correlation						.374**	.165
	Sig. (2-tailed)						.005	.225
	N						55	56
CTI-TP3	Pearson Correlation							0.130
	Sig. (2-tailed)							.339
	N							56

Hypothesis 3: The group scores for realistic optimism for the intervention group will be higher than for the control group

For this analysis, we first did a one-way ANOVA on the baseline optimism measures to ensure that there were no reliable differences between the groups. The means can be seen in Figure 1 ($p > 0.16$ for all). For the students that received the optimism intervention, we assessed optimism before and after the intervention. So, we ran an ANCOVA with the pre-intervention optimism scores for Timepoint 1 and Timepoint 3 as the covariates. Contrary to our original hypothesis, there was no significant difference between the two groups at Timepoint 1 (LOT-R Timepoint 1, $F=0.401$ $p=0.529$) (CTI Timepoint 1, $F=3.727$ $p=0.58$) (OBS Timepoint 1, $F=3.077$ $p=0.084$). The same was true at Timepoint 3, (CTI Timepoint 3, $F=0.389$, $p=0.535$) (LOT-R Timepoint 3, $F=0.065$, $p=0.800$) with one

exception: there was a significant difference between the two groups on the Optimism Bias measure ($F=5.477, p=0.023$). The intervention group had lower optimism bias scale scores compared to the control group, indicating that these participants had shifted towards being more cautiously optimistic. It is possible that the intervention took a little while longer to work than had been anticipated, and it had to be administered twice before seeing a difference. This finding *does* partially support the hypothesis that students can be shifted to think more cautiously optimistic.



Hypothesis 4: The level of optimism will determine student’s performance on the exam.

At timepoints 2 and 4 students reported their exam grades for test 1 and test 2 respectively. The exam grades were subsequently coded into the categories students used to predict grades. At timepoints 1 and 3, students were asked to predict the range of their

exam grade. Performance on exam 1 could be predicted from student's expectations ($t=2.363, p=0.021$)($R=0.281$). However, performance on exam 2 could not be predicted from student's expectations ($t=0.823, p=0.414$) ($R=0.112$). We ran a 2-step regression with the first step being predicting expectation from grade then the second step being the optimism measures. There was no significant prediction at timepoint 1 (LOT-R, $t=0.602$ $p=0.552$), (CTI, $t=1.694$ $p=.095$) (OBS, $t=1.599$ $p=0.115$). At timepoint 3 there was no significant prediction with the CTI measure ($t=-0.599, p=0.552$), OBS measure ($t=-0.479, p=0.634$) or LOT measure ($t=0.128, p=0.899$). We had hypothesized that level of optimism could predict test performance, but the data did not support this prediction.

Research Question: What coping behaviors are associated with more realistic optimism and test performance?

To answer this question, we constructed two sets of correlation matrices: one at each of the four time points of the optimism measures at that time point along with the coping variables (Correlation Table 7, 8, 9) and the second to investigate the relationships between coping measures before and after every exam (See Correlation Table 6). Students that scored lower on Exam 1 tended to engage in **information seeking** ($r=-0.278, p<0.05$), **rumination** ($r=-0.376, p<0.01$) and **wishful thinking** ($r=-0.520, p<0.01$) post Exam 1 and **rumination** ($r=-0.282, p<0.05$), **active coping** ($r=-0.293, p<0.05$) and **wishful thinking** ($r=-0.339$) prior to Exam 2. The students that performed poorly on Exam 1 also tended to cope with **rumination** after Exam 2 ($r=-0.282, p<0.01$). The better students performed on Exam 2, the more likely they were to have had engaged in **humor** as a coping method after Exam 1 ($r=0.386, p<0.01$). The lower students scored on Exam 2, the more likely they were to engage in **behavioral disengagement** ($r=-0.330, p<0.05$) and **denial** ($r=-0.307, p<0.05$).

The better students did on the exam the more likely they were to engage in **self-encouragement** ($r=0.333, p<0.05$) and **sustain coping** ($r=0.372, p<0.01$).

Correlation Table 6: Grade Exam 1 and 2		
	Grade Exam 1	Grade Exam 2
Infoseek Tp2	-0.278*	-0.014
Humor TP 2	-0.076	0.386**
Rumination Tp2	-0.376**	-0.042
Savor Cope Tp2	0.266*	0.100
Sustain Tp2	0.395**	0.042
Wish Thinking Tp2	-0.520**	0.225
Active Tp3	-0.293*	-0.035
Ruminate Tp3	-0.282*	0.076
Wish Thinking Tp3	-0.339*	0.187
Behavioral Disengagement Tp4	-0.063	-0.330*
Denial Tp 4	-0.031	-0.307*
Ruminate Tp 4	-0.280*	-0.140
Sustain Tp 4	0.018	0.372**
Self Encouragement Tp4	-0.048	0.333*

*Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

NOTE: Some of the variables were not depicted because there were no statistically reliable observations were observed.

Prior to the first exam, students that scored higher on CTI, indicating more unrealistic optimism tended to engage more in **Express coping** ($r=0.259, p<0.05$), **Persevere Coping** ($r=0.354, p<0.01$), **Rumination** ($r=0.241, p<0.05$) and **Social Support** ($r=0.290, p<0.01$). Strangely enough, there was a direct contradiction with the OB, which indicated that individuals that tended to be more realistically optimistic tended to **ruminate** more ($-0.275, p<0.05$). On the LOT scale, students that tended to score higher, indicative of dispositional optimism also tended to engage in more **religious coping** behaviors ($r=0.270, p<0.05$). On the other hand, a low score on the CTI, indicative of more realistic optimism, was associated with **reprioritizing** coping ($r=-0.345, p<0.01$). Lower

scores on the LOT scale, indicative of more pessimism, were associated with higher **behavioral disengagement** ($r=-0.348, p<0.05$), **higher physical disengagement** ($r=-0.354, p<0.01$), **higher self-isolation** ($r=-0.333, p<0.01$), **more stoicism** ($r=-0.277, p<0.05$), **more suppression** ($r=-0.345, p<0.05$) and **more wishful thinking** ($r=-0.284, p<0.05$). See Correlation Table 7 for values.

Correlation Table 7: Timepoint 1			
	CTI TP 1	LOT TP1	OBS TP1
Accept TP 1	0.053	0.134	-0.132
Behavioral Disengagement TP 1	-0.155	-0.348*	0.148
Express TP 1	0.259*	0.023	0.039
Persevere Cope TP 1	0.354**	-0.149	-0.149
Physical Disengagement TP1	-0.082	-0.354**	0.075
Reprioritize TP1	-0.345**	-0.007	0.008
Ruminate TP 1	0.241*	-0.181	-0.275*
Self-Isolate TP 1	-0.100	-0.333**	-0.006
Social Support TP 1	0.290**	0.031	-0.076
Stoicism TP 1	0.018	-0.277*	0.063
Suppress TP 1	-0.181	-0.345**	-0.048
Religion TP 1	0.182	0.270*	-0.087
Wishthink TP 1	-0.157	-0.284*	0.040

*Correlation is significant at the 0.05 level (2-tailed)
 ** Correlation is significant at the 0.01 level (2-tailed)
 NOTE: Some of the variables were not depicted because there were no statistically reliable observations were observed.

After receiving exam grades back, students that scored more unrealistically on the CTI score tended to engage in **savor coping** ($r=0.275, p<0.05$), and students that tended to score more realistically on the scale engaged in **reprioritizing coping** ($r=-0.245, p<0.05$). See Correlation Table 8 below for values.

Correlation Table 8: Timepoint 2	
	CTI TP 2

Reprioritize TP 2	-0.245*
Savor Cope TP 2	0.275*

*Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

NOTE: Some of the variables were not depicted because there were no statistically reliable observations were observed.

Prior to the third exam, there was a positive relationship between students optimism on the CTI scale and **active coping** (r=0.446, p<0.01), **express coping** (r=0.278, p<0.05), **understand coping** (r=0.372, p<0.01), **help coping** (r=0.346, p<0.05), **persevere coping** (r=0.446, p<0.01), **plan coping** (r=0.415, p<0.01) and **savor coping** (r=0.325, p<0.05). Students that scored high on the LOT, indicating high levels of dispositional optimism, tended to engage in **reprioritizing coping** (r=0.276, p<0.05). A lower score on the LOT, hinting at a more pessimistic outlook was associated with higher levels of **self-encouragement** (r=-0.241, p<0.05), **self-isolation** (r=-0.504, p<0.01), and more **stoicism** (r=-0.480, p<0.01). More realistically optimism individuals as indicated on the OBS tended to engage more in **accept coping** (r=-0.287, p<0.05). See Correlation Table 9 for more values.

Correlation Table 9: Timepoint 3			
	CTI TP 3	LOT TP3	OBS TP3
Accept TP3	0.113	0.239	-0.287*
Active TP 3	0.446**	0.011	-0.187
Express TP 3	0.278*	0.009	-0.074
Understand TP 3	0.372**	0.036	-0.106
Help Cope TP 3	0.346*	0.205	-0.002
Persevere TP 3	0.446**	0.171	-0.263
Plan TP3	0.415**	0.162	-0.137
Reprioritize TP 3	0.239	0.276*	0.231
Savor Cope TP 3	0.325*	0.122	0.049
Self Encouragement TP 3	0.177	-0.341*	0.018

Self Isolate TP 3	-0.095	-0.504**	-0.044
Suppress TP 3	0.063	-0.435*	-0.026
Stoicism TP 3	-0.128	-0.480**	-0.155

*Correlation is significant at the 0.05 level (2-tailed)
 ** Correlation is significant at the 0.01 level (2-tailed)
 NOTE: Some of the variables were not depicted because there were no statistically reliable observations were observed.

After Exam 2, students that scored higher on the CTI scale, tended to engage more in **express coping** (r=0.429, p<0.01), **plan coping** (r=0.484, p<0.01), **persevere coping** (r=0.371, p<0.01), **information seeking** (r=0.451, p<0.01), **understand coping** (r=0.412, p<0.05), **sustain coping** (r=0.293, p<0.01), **savor coping** (r=0.325, p<0.01) and **social support** (r=0.476, p<0.01). Individuals scoring lower on the CTI tended to engage more in **stoicism** (r=-0.279, p<0.05). See Correlation Table 10 for values.

Correlation Table 10: Timepoint 4	
	CTI TP 4
Express TP 4	0.429**
Plan TP 4	0.484**
Persevere TP 4	0.371**
Infoseek TP 4	0.451**
Understand TP 4	0.412**
Sustain TP 4	0.293*
Stoicism TP 4	-0.279*
Savor Cope TP 4	0.325*
Social Support TP 4	0.476**

*Correlation is significant at the 0.05 level (2-tailed)
 ** Correlation is significant at the 0.01 level (2-tailed)
 NOTE: Some of the variables were not depicted because there were no statistically reliable observations were observed.

Discussion

The present study had two purposes: to examine the effects of realistic and unrealistic optimism on performance and coping across two exams as well as to test a realistic optimism intervention. Historically, optimism has been studied as a dichotomous

variable with the binary being pessimistic or optimistic. However, Wallston (1994) identified two distinct types of optimism existing on the continuum: cock-eyed/unrealistic and cautious/realistic optimism. The present study studied these constructs in an academic setting to determine if students could become more cautiously optimistic as a result of an intervention. The intervention was designed as a series of free write responses focused on engaging participants in behaviors typically associated with cautious optimism: creating a plan B, introducing the possibility of failure, accurately perceiving strengths and weaknesses and taking inventory of available resources (review sessions, office hours, tutoring, etc.). Our hypothesis was that students that were exposed to the intervention would not only become significantly more cautiously optimistic, but they would also perform better on the exam and exhibit healthier coping behaviors.

Overall, the shifts towards cautious optimism were not large enough to be statistically reliable and thus could not lend support to the hypothesis, with one exception: the Optimism Bias scale after the second round of intervention. At this testing point, there *was* a shift towards lower scale scores by the intervention group relative to the control group, indicating that students had become more cautiously optimistic. Furthermore, it is important to note that consistent with prior research (Alloy and Abramson, 1979), we *did* see a tendency for students to significantly overshoot their expectation for both exams. This tendency to over-exaggerate supports the idea that unrealistic/cock-eyed optimism *is* pervasive within this group of students.

Originally, we predicted that exam scores would be correlated with the optimism measures. The logic was that if students were more cautiously optimistic, they would receive better grades. However, there were no significant correlations in the data except

for an unexpected negative relationship between the second exam and the LOT-R score. This was surprising, because the LOT is a measure of dispositional optimism, so theoretically, lower scores would be indicative of a more pessimistic outlook. The data suggested that this pessimistic outlook was associated with higher exam scores.

At the outset, we predicted that level of optimism would predict exam grades received for both exams. The data indicated that Exam 1 could be predicted from expectation, but that Exam 2 could not. The data also indicated that level of optimism did not predict grades received on the exams. One possible interpretation of this is that the attitudes that students hold are not stronger than other factors such as the behaviors engaged in prior to the exams. Another possibility is that there are a wide variety of factors that go into predicting an exam score, and no one factor is strong enough to predict on its own.

Low performance on Exam 1 was associated with information seeking, wishful thinking and rumination following the news of the grade. Information seeking refers to the active coping method of finding out more information about the exam. Since students tended to over-estimate their exam grade, making sense of why they did not do as well as they thought they would is adaptive. The inverse relationship between performance and wishful thinking is also not surprising. If students wanted to perform well and they received a low grade, it is natural that they would wish they could change the situation. Although colloquially, rumination tends to have a negative connotation, in the case of the present study it was considered to be an adaptive coping mechanism. The lower the students scored on Exam 1, the more likely they were to approach Exam 2 with rumination, active coping and wishful thinking. Active coping is conceptualized as taking direct action

in a situation. It is possible to imagine that if a student performed poorly on the first exam, he/she would try to take action to ameliorate the class grade.

Interestingly enough, low grades on Exam 2 were associated with different coping behaviors than that of Exam 1: behavioral disengagement and denial. Behavioral disengagement in the COPE scale is characterized by giving up on reaching a goal. Although exam 1 and exam 2 were not significantly correlated, it is possible to imagine a student behaviorally disengaging after poor performance on two exams. In addition to behavioral disengagement, denial also had a negative relationship with grades on the second exam. Instead of actively coping with the poor performance, students seemed to withdraw. On the contrary, if students did well on the second exam, they were more likely to engage in self-encouragement and sustain coping. Sustain coping is another form of active coping as it involves actively trying to progress or at least maintain the current situation. Students who performed well on the second exam felt in control and subsequently engaged in more active coping than those that performed poorly on the second exam. This is interesting, as it suggests that not only are students coping behaviors malleable over time, but that after a certain point in the semester, some students may feel like giving up due to poor performance. Theoretically, even if students had performed poorly on Exam 1 and Exam 2, there would still be a chance for them to succeed in the class. However, the engagement and withdrawal could prevent this type of comeback success.

In addition to coping behaviors associated with performance, we also examined coping behaviors associated with the level of optimism at each timepoint. The CTI is used to measure the tendency individuals have to overgeneralize positive outcomes. We conceptualized a higher score on this subscale as being more unrealistically optimistic.

Prior to the first exam, there was a positive relationship between score on the CTI and express coping, persevere coping, seeking social support and rumination. If individuals are engaging in express coping, then they are expressing their feelings about the situation. Persevere coping is straightforward and involves adopting an attitude of perseverance. Conceptually, it makes sense that individuals who are more optimistic would adopt an attitude of perseverance. Students who scored lower on the optimism bias scale, indicating a more realistically optimistic outlook, tended to engage in *more* rumination. The LOT was designed to serve as a continuum measure between optimism and pessimism- the higher the scores on the scales, the more dispositional optimism exhibited by the individual. The lower the students scored on the scale, the more likely the student was to engage in self-isolation, stoicism, suppression and less self-encouragement. These maladaptive coping behaviors are to be expected the closer an individual scores to the pessimism side of the scale.

Students that were more unrealistically optimistic on the CTI scale tended to engage in active coping, express coping, understand coping, help coping, persevere coping, plan coping and savor coping. All of these coping behaviors are quite adaptive in that they help the student prepare in studying for the next exam. The coping behaviors were a bit more varied than those prior to exam 1, but nonetheless very similar. Students that had higher scores, tended to engage in more reprioritizing coping. Those that were more realistically optimistic as expressed by the OB scale tended to engage in more accept coping. This was not surprising, as realistic optimistic is characterized with introducing the possibility of failure into the world. Therefore, these types of students would have had to use acceptance as a coping measure. Those that scored lower on the LOT indicating a more pessimistic

outlook tended to engage in more self-encouragement, self-isolation and more stoicism. The self-encouragement was surprising, as we expected those with a more pessimistic outlook to be more critical.

After the first exam, students with a more unrealistically optimistic attitude tended to engage more in savor coping. Savor coping is associated with “savoring” the moment. While at first this may seem like a strange coping behavior, it can involve attempting to achieve perspective in a situation. For example, a cognition could include “at least I am at Vanderbilt”. Students that were more realistically optimistic tended to engage more in reprioritizing. This involved telling oneself that the exam “wasn’t a big deal” and that “other things are more important than the exam”. The coping behaviors exhibited after the second exam were much more varied than the first. There was a positive relationship between level of optimism and express coping, plan coping, persevering, information seeking, understand coping, sustain coping, savor coping and social support. Furthermore, there was a negative relationship between CTI and stoicism. Most of the coping behaviors exhibited with higher levels of CTI, which we interpreted as indicative of unrealistic optimism, were positive coping behaviors. This was surprising, as we expected these individuals to engage in maladaptive coping behaviors.

Overall, this study suggested that there does seem to be unrealistic optimism pervasive among students, as they tended to over-exaggerate their predictions for their exam grades. Additionally, it is possible to shift students into a more cautiously optimistic outlook, albeit not enough that yields statistical reliability in every scale. The data on coping behaviors supports the idea that coping behaviors are constantly changing and are

malleable, but it also indicated markedly different responses between high and low performers on Exam 2, suggesting a potentially critical period for an intervention.

Limitations

The present study had its limitations including problems with consistency across the three optimism measures, strength of the intervention, lack of correlation between exam scores and small sample size. Each of the three optimism measures used was chosen, because theoretically the scale captured a type of optimism. The LOT captured dispositional optimism, and the CTI and OBS were conceptualized as capturing unrealistic optimism. However, it is possible that the wording between the CTI and LOT-R was too general to capture sensitive changes in optimism in students. The wording of the OBS was more specific, but theoretically, one would have expected it to correlate with the CTI as those measures did with each other. However, this was not the case.

Future Directions

In the future, there are many possibilities for expansion of this study. One of the biggest limitations of the study was the lack of available scales to truly capture realistic and unrealistic optimism. The development of a series of items designed to act as reflective of a continuum between the differing types of optimism is necessary in order to capture even the most minute of changes. Furthermore, a more powerful intervention could be developed in the future, perhaps with a measure of adherence included. Due to the nature of the study of this design, we were very limited as to how powerful we could make the intervention. Future interventions could be designed to be more extensive as well as target coping behaviors.

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Appendix A: LOT-R Naïve Optimism Scale

1. In uncertain times, I usually expect the best.
2. [It's easy for me to relax]
3. If something can go wrong for me, it will
4. I'm always optimistic about my future
5. [I enjoy my friends a lot]
6. [It's important for me to keep busy]
7. I hardly ever expect things to go my way
8. [I don't get upset too easily]
9. I rarely count on good things happening to me
10. Overall, I expect more good things to happen to me than bad

Note: Items 2,5,6 and 8 are fillers. High values imply optimism.

Appendix B: Constructive Thinking Inventory

1. If I do well on an important test, I feel like a total success and that I will go very far in life.
2. I think everyone should love their parents.
3. If I do something good, then good things will happen to me.
4. When something good happens to me, I feel that more good things are likely to follow.
5. I usually look at the good side of things.
6. When I discover someone I like a lot likes me, it makes me feel like a wonderful person and that I can accomplish whatever I want to.
7. I think anyone who really wants a good job can find one.
8. People should try to look happy, no matter how they feel.
9. Almost all people are good at heart.

Appendix C: Optimism Bias Scale

1. I expect to complete personal projects in less time than it actually takes to complete them.
2. I expect to receive higher scores on exams than I actually do.
3. I often have the best of intentions when preparing for an exam, but find that I ultimately get distracted.
4. I find myself studying with others and ultimately spending more time socializing than being productive in studying.
5. I self-sabotage my efforts to do my best work on a project or schoolwork.
6. I go out with close friends even when I know that I have important schoolwork to complete.
7. I feel that it is more important to manage my stress by spending time with friends than locking myself away studying for an exam or preparing an assignment.
8. Even when I am left with little time to prepare for an upcoming assignment, I remain optimistic that everything will work out fine.
9. I feel that I work well under pressure, and I do my best work under short deadlines.

Appendix D: Coping Subscales

Accept Coping

1. I am accepting that it happened and can't be changed
2. I am accepting the reality of the situation
3. I am learning to live with the situation

Active Coping

1. I am taking additional action
2. I am taking direct action to address the situation

Behavioral Disengagement Coping

1. I am admitting to myself that I can't deal with the situation, and quit trying
2. I am giving up on trying to reach my goal
3. I am giving up the attempt to get what I want

Denial Coping

1. I am refusing to believe that it happened
2. I am pretending that it isn't really happening
3. I am acting as though the situation isn't even happening

Express Coping

1. I am finding myself expressing my feelings a lot
2. I am letting out my feelings

Help Coping

1. I am doing something for someone else
2. I am trying to do something for someone else's benefit

Information Seeking

1. I am trying to find out more about the exam
2. I am seeking out more information

Persevere Coping

1. I keep working toward my goal
2. I am refusing to give up
3. I am pushing forward

Physical Disengagement Coping

1. I am getting away from the situation
2. I am physically removing myself from the situation
3. I am physically separating myself from what is happening

Plan Coping

1. I am making a plan of action
2. I am trying to come up with a strategy about what to do
3. I am thinking about what steps to take next

Reprioritize Coping

1. I am telling myself that the exam isn't that big of a deal
2. I am telling myself that other things are more important to me than the exam
3. I am telling myself that the exam doesn't matter that much to me

Ruminate Coping

1. I keep thinking about the exam

2. I keep analyzing the situation
3. I keep replaying the situation in my mind

Savor Coping

1. I am trying to savor what is going on
2. I am trying to maximize how I am feeling
3. I am trying to enjoy the moment

Social Support Coping

1. I am discussing my feelings with someone else
2. I am talking to someone about how I feel
3. I am talking to someone about the situation

Self Account Coping

1. I am holding myself accountable for how things are going
2. I am thinking about how I am the one responsible for the situation

Self-Encouragement Coping

1. I am telling myself I can handle the situation
2. I am telling myself I can deal with the situation

Self Isolate Coping

1. I am avoiding being with people in general
2. I am keeping others from knowing what is going on

Self Restraint Coping

1. I am restraining myself from doing anything too quickly
2. I am holding off on doing anything about it until the situation is right
3. I am forcing myself to wait for the right time to do something

Stoicism Coping

1. I am trying to keep my feelings to myself
2. I am keeping others from knowing what is going on

Suppress Coping

1. I am suppressing my feelings
2. I am trying to push my feelings away
3. I am burying my feelings deep inside

Sustain Coping

1. I am trying to keep things the way they are
2. I am doing my best to maintain what is going on
3. I am trying to sustain what is going on

Religion Coping

1. I am putting my trust in God
2. I am seeking God's help
3. I am trying to find comfort in my religion

Understand Coping

1. I am trying to understand what is going on
2. I am doing my best to make sense of the situation
3. I am trying to gain a better understanding of the situation

Humor Coping

1. I am making jokes about the exam
2. I am kidding around about the exam

Drugs Coping

1. I am trying to lose myself for awhile by using drugs or alcohol
2. I am drinking alcohol or using drugs in order to think about it less
3. I am using alcohol or drugs to help me get through it

Wishful Thinking

1. I am wishing that I could change the way that things are going
2. I am wishing the situation would somehow be how I want

Appendix E: Intervention

1. Earlier in this survey, you were asked to outline a specific goal for your test or paper. In order to effectively direct mental resources, it is important to differentiate between goals that are possible with hard work, and goals that are not possible at all or at the very least highly unlikely. For example, unless your professor is keen on giving 20 points of extra credit, it is highly unlikely that you would receive 120% on this paper or test. With this in mind please answer the following questions in detail: Do you think that this goal is feasible? Why or why not?
2. Assuming that you did not reach your goal on this assignment, are there still steps that you could take to reach your overall goal in this class? Being aware of other paths to reaching your end goal is a great way of staying on track. Falling short of a specific goal is a possibility, but it is less detrimental if we have formed a plan B on how to reach the end goal.
3. Although we have already outlined the specific goal for your test or paper, it is also important to maintain a global goal. After all, this paper or test is only a component of the final grade in the class. Keeping in mind the information you just received about the importance of goals that are feasible with hard work, what is your overall goal for this class at this point? Why is this feasible? Why do you want this grade?
4. One of the useful skills that continue to emerge in existing research is that of planning in improving time management. In order to maximize your potential for this paper or test, it is a good idea to have a mental plan of how you plan on reaching your goal and how you plan to organize your time in the week. Please go into detail on the steps of how you plan on studying/writing (i.e. do you plan on skipping any extracurricular activities? pulling an all nighter the day before? Are you going to go out even for a little bit if your test is on Wednesday?) Try to be as realistic as possible as the goal of this question is to actually denote what you are going to do not give us an answer of what a "perfect" student would do. It is designed to help you organize your time. Please attempt to answer this question with as much breadth as possible.
5. In order to avoid making the same mistakes that you have made before, please answer the following questions: What have been your challenges in the past with papers or tests in this class? What can you do to prevent those obstacles from hurting you in this task? If you have not explicitly outlined these mistakes, there is always the possibility of committing them again. This repetition of mistakes could result in a failure to reach your goal.
6. There have probably been a lot of helpful strategies that you have implemented into your work that have resulted in positive outcomes. Being aware of your strengths within a certain class and capitalizing on them will aid success in the long term. With this in mind, what have been your strengths in this class and how can you incorporate those into how you prepare this paper or study for this test?
7. Planning is also really important in order to draw a general map of how you plan on completing your academic test or paper. Please outline steps for how you plan to study for this test or write this paper. Again, make these as realistic as possible. The goal is to write down what is feasible within your own life. If you never write an outline before a paper, do not say that you are going to. As an example for studying for a test, your answer could go something like 1. Read chapters over again 2. Take notes on chapters 3.

Make flashcards 4. Study flashcards

8. Vanderbilt offers a variety of resources available to all students. Resources can be really helpful when completing an academic task, because they can serve as buffers in order to prevent mistakes. The issue is that a lot of the time, these resources are not even considered when studying for a test or writing a paper. In order to bring these to mind, please answer the following question: what are the resources available to you on campus?
9. Part of creating a road map to success is introducing the possibility of failure. Thinking about potential outcomes can actually strengthen our map to success, because it forces us to think about what could hurt our chances. Is there a chance that you could not reach your goal for your test/paper? Why/why not? Again, please be as honest as possible when answering this. For example, if you know that you often go out, is it possible that you could disregard the assignment and just go out the night before it is due? If you are currently in a fight with your friends, and there is a possibility that this could cut into your studying time, could this potentially hold you back from reaching your goal? Please try to be as specific you can.
10. In addition to campus resources, there are also a variety of resources provided specifically in the classroom setting. These are put into place by the professor in order to address common difficulties students face. Taking full advantage of these can make it easier to reach your goal. What are the resources available to you in the class? (i.e. does your teacher have office hours? If so, when? Is there a review session? Is/are there any TA(s)? Is there extra credit in the class?)