

2004

Realism or Distortion in Predicting and Evaluating Exam Performance Among Depressed and Nondepressed Students

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Philadelphia College of Osteopathic Medicine
Department of Psychology

REALISM OR DISTORTION IN PREDICTING AND EVALUATING EXAM
PERFORMANCE AMONG DEPRESSED AND NONDEPRESSED STUDENTS

By Michael J. Kinney

Submitted in Partial Fulfillment
of the Requirements for the Degree of

Doctor of Psychology

January 2004

**PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY**

Dissertation Approval

This is to certify that the thesis presented to us by Michael J. Kinney on
the 4 day of September, 2003, in partial fulfillment of the requirements for
the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and
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Abstract

Cognitive behavioral theories suggest that depressed people have negatively distorted and inaccurate perceptions and cognitions. The present study measures the accuracy of cognitions by comparing predictions made by depressed and by nondepressed students when they estimate the scores they will earn on an examination. It also compares depressed and nondepressed students on their levels of satisfaction with their exam scores. No difference was found between depressed and nondepressed students in either their predictions of their exam grades or their level of satisfaction with their exam grades. This study fails to support the notion that depression correlates with negative cognitive distortions. Depressed and nondepressed students were alike in their cognitive accuracy in predicting exam grades and in their cognitive satisfaction level with their grades.

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Realism or Distortion in Predicting and Evaluating Exam Performance Among Depressed and Nondepressed Students

There is a growing body of cognitive-behavioral literature suggesting that depressed patients are predisposed to negative distortions in their thought processes. Freeman and Oster (1999) have gone so far as to suggest that some depressed people have dysfunctional beliefs that rise to the level of almost fixed delusional quality. For example, Freeman and Oster describe a depressed patient who believes himself to be unloved and unlovable, in spite of the fact that 98.3 percent of the people in that depressed individual's life find him to be quite lovable. To maintain the belief in himself as unlovable, the patient must somehow distort his thinking to discount or explain away the vast majority of people in his life who love him. This is the kind of negatively distorted thinking that becomes the central focus of treatment interventions for cognitive-behavioral therapists working with depressed patients. Cognitive-behavioral therapists strive to help depressed patients eliminate their negative cognitive distortions and think more accurately and realistically.

The research literature, however, does not consistently support the notion that those who are depressed think in a distorted manner. There are numerous studies that support the position that people who suffer from depression tend to be more negative in their thinking than those who do not suffer from depression (e.g. Alloy, Abramson, Murray, Whitehouse, & Hogan, 1997). It is not clear, however, that the negative thoughts and beliefs of the depressed are distorted or inaccurate. In fact, there is evidence that suggests the depressed are more accurate in their perceptions and judgments, but the nondepressed tend to distort their thinking in an overly positive direction (e.g. Alloy & Abramson, 1979). The conclusion that depressed people are more negative in their thinking is not disputed. The controversy arises when researchers suggest that the

negative thoughts of the depressed are distortions. That is the area in which research findings differ and are not conclusive. What is in dispute is not the negativity of the thoughts and beliefs for the depressed but the accuracy of those thoughts and beliefs. Because there is no clear consensus in the literature regarding the accuracy or the distortion of the thoughts, beliefs, and perceptions of either the depressed or the nondepressed, further study is necessary.

The first section of this paper will examine the cognitive-behavioral theory of depression as proposed by Aaron Beck. Dr. Beck's concept of cognitive schema will be explained along with its influence on the thinking of people who have depressive symptoms. The next section of the paper will explore the research literature that demonstrates the fact that those who suffer from depression are more negative in their thinking than their counterparts who do not suffer from depression.

Depressive realism will be examined in the next section of the paper. Depressive realism is the notion that those who have depressive symptoms are actually more realistic and accurate in their thinking than those who do not have depressive symptoms. This concept suggests that depression tends to allow people to see things more realistically, while those who are not depressed have an unjustified and unrealistic optimism that distorts their thinking in an overly positive direction.

A number of studies are then reviewed that shed light on the accuracy of the cognitions of depressed research participants with regard to their social performance. Research findings in the area of social performance and self-evaluations of that social performance are complex and unclear. There is evidence to suggest that depressed people are more realistic and accurate in evaluating their own social performance, including their impact on others. There is also evidence to suggest that the depressed see themselves in a more negative light than their social interaction partners see them. There is further evidence indicating that depression in one partner of a social dyad influences the

nondepressed partner to alter his or her social interactions and actually to behave in a more negative manner.

Attributional theory is explained in the next section of the paper. Cognitive attributions can influence peoples' reactions to negative events as well as to positive events that occur in their lives. With some patterns of attribution, depressive symptoms become less likely while other attributional patterns seem to increase the likelihood of depression as an emotional reaction when negative or unpleasant events occur.

The next sections of the paper deal with possible gender-effects in research on depression and the use of self-report instruments in depression research. The research literature does not suggest that gender plays an influential role in studies of judgment, of perception, or of predictions made by depressed and nondepressed participants. Self-report psychological tests are used in the research design described in this paper. Therefore, the strengths and limitations of self-report psychological measures are reviewed.

The research methodology is then described in detail. The present study measures the accuracy of cognitions by comparing predictions made by depressed and by nondepressed students when they estimate the scores they will earn on a final examination for school. It also compares depressed and nondepressed students on their level of satisfaction with their exam scores.

Review of the Literature

Aaron Beck's cognitive-behavioral theory of depression involves cognitive distortions or faulty information processing as a core concept (Beck, 1967; Beck, Rush, Shaw, & Emery, 1979, Beck & Freeman, 1990; Beck, 1996). Beck suggested that depressed persons perceive situations negatively when a more positive interpretation is

equally possible and more accurate. His cognitive triad of depression involves an inclination to view the self, the world, and the future in a negative light. According to Beck's theory, the depressed person's cognitions are negatively biased and operate by filtering out positive information, exaggerating negative interpretations instead. These negative expectations and interpretations lead to depressed affect.

In Beck's theory, schema are used to explain systematic patterns of errors in thought or in cognitive distortions made by depressed persons. Schema are cognitive structures derived from past experiences that operate to interpret and give meaning to current experiences. They guide subsequent perceptions and judgments. For instance, negative self-schema can lead depressed people to view themselves as unworthy and undesirable. This view, in turn, can bias their judgments of events so that they appear to be evidence of failure or rejection. Information that is not consistent with the negative schema is overlooked or ignored; confirmatory data, however, is given undue weight. Segal (1988) explains it well when he writes, "Cognitive distortions are the products of the misinterpretation or misperception of objective reality in such a way that the conclusions reached by depressed people confirm their negative expectations" (p. 148).

The cognitive theories of depression (Beck, 1967; Ellis, 1973; Seligman, 1975) have been extremely influential in explaining the phenomenon of depression and in shaping the therapeutic interventions used to treat it. The cognitive approaches generally suggest that patients' patterns of thinking are the foundations of their affective life, and that negative thought patterns produce and maintain depression. Therapeutic interventions are often designed to help the patient become aware of negative cognitions that lead to depression. Therapeutic improvement is fostered by guiding patients to eliminate negatively distorted perceptions in order to become more accurate in their cognitive assessments and conclusions. Therapists, for instance, will sometimes encourage depressed patients to be more empirical in their judgments and to evaluate

more accurately the “data” of their life-experiences. In short, patients are encouraged to correct inaccurate conclusions that they are imposing on events and to be more realistic in their understanding of events. Patients may be asked to conduct behavioral experiments as part of the therapy process. If patients believe that they are unpopular and that people dislike them, they may be encouraged to ask a sample of 10 people whom they know if they are liked or disliked. When some of those surveyed respond favorably, the depressed patients are encouraged to reevaluate their negative cognitions regarding unpopularity and worthlessness. Such a cognitive-behavioral approach is based on the notion that depressed persons’ thoughts are distorted, inaccurate, and incorrect. In therapy, patients attempt to experience events in a less biased way in order to shift negative cognitive distortions in a more positive and accurate direction.

Depressed Are More Negative Than Nondepressed

A variety of studies have demonstrated the fact that the depressed are more aware of and more active in processing negative self-referent information when compared with the nondepressed (Alloy, Abramson, Murray, Whitehouse, & Hogan, 1997; Gara, Woolfold, Cohen, & Goldston, 1993; Gotlib, 1982; Nelson & Craighead, 1977; Segal, Gemar, Truchon, Guirguis, & Horowitz, 1995; Wenzlaff & Grozier, 1988). These studies support the notion that depressed people are more negative in their thinking in that they are more aware of negative feedback. However, increased awareness does not necessarily mean distortion. Without some independent measure of reality, we cannot conclude that depressed people are negatively distorting reality, just that they have a heightened awareness of the negative aspects of reality. It remains possible that those who are depressed are actually experiencing a more negative reality than those who are not depressed. This is exactly the conclusion suggested by Coyne and Gotlib (1983). They

are critical of the conclusion that the cognitive theorists have offered which suggests that depression is the result of negative distortions of reality. Coyne and Gotlib offer the alternative hypothesis that depression is produced and maintained by negative life circumstances that are accurately perceived by the depressed person. Coyne and Gotlib agree that depressed persons evaluate themselves and their performance more negatively than do nondepressed controls, but they question whether these evaluations are distortions. They suggest, instead, that depression is more closely related to actual environmental antecedents and consequences and is not determined by cognitive distortions of reality. They believe that negative realities produce and maintain depression rather than negative cognitions that distort reality.

In an interesting demonstration of negative realities, Swann, Hixon, and De La Ronde (1997) found that marriage partners were most committed to spouses who confirmed their own self-view. That was also true when that self-view was negative. Depressed persons were more committed to spouses who shared their negative view of themselves than to spouses who had a more positive view than they, themselves, held. Therefore, depressed people with negative self-concepts were more committed to their marriages if their spouses held negative views of them than if their spouses held more positive views of them. This study seems to provide evidence that depression and negative self-conceptions become self-fulfilling. Awareness of negative feedback about the self among the depressed becomes increasingly confirmed and is, therefore, increasingly accurate within the depressed person's environment. This may be the result of the depressed person's tendency to associate selectively with people who confirm their own beliefs about their inadequacies and unworthiness.

Alloy and Ahrens (1987) found that depressed college students were more pessimistic than nondepressed students when predicting future successes and failures. Both depressed and nondepressed participants predicted more successes than failures in

their futures. However, the depressed group was much more pessimistic than the nondepressed group when forecasting future events in their own lives as well as in the lives of hypothetical others similar to themselves. The nondepressed group showed more optimism in their predictions for their own future.

One study demonstrated physiological evidence of increased negative expectations among the depressed (Blackburn, Roxborough, Muir, Glabus, & Blackwood, 1990). Event Related Potentials (ERPs) are physiological reactions that reflect information processing activities within the brain. The amplitude of the ERP is assumed to be an empirical measure of the strength of information processing within the individual. Information that is consistent with the individual's expectations requires a lower amplitude response to process than information that is inconsistent with the individual's expectations. Depressed participants showed lower amplitude responses to negative stimuli than to neutral or positive stimuli. Nondepressed participants showed larger amplitude responses to negative stimuli than to neutral or positive stimuli. The authors conclude that those who are depressed expect negative information and process that information with less effort, while the nondepressed are more easily aroused by negative stimuli because it is inconsistent with their expectations.

Depressive Realism and Accuracy

Alloy and Abramson (1979) shook the foundations of the cognitive theory of depression when they conducted a study in which depressed participants were more accurate in their judgments than the nondepressed participants who demonstrated a tendency to distort their perceptions in a positive direction. They tested a deduction from the learned helplessness model (Seligman, 1975) which hypothesized that depressed individuals will underestimate the degree of contingency between their behavior and

environmental outcomes. The model suggests that having learned to be helpless, depressed people will not expect their actions to lead to results. Participants were asked to press a button or not to press a button. The environmental outcome was a green light that either turned on or did not turn on. Participants were then asked to estimate the degree of contingency between their button-pressing and the onset of the light. Undergraduates from the University of Pennsylvania were studied and were assigned to depressed and nondepressed groups on the basis of their Beck Depression Inventory scores. Green light onset was fixed at 25%, 50%, and 75% levels and was not contingent upon whether the students pushed the button or not. When the outcome (onset of the light) occurred infrequently (25%), both the depressed and the nondepressed groups were accurate in estimating the percentage of light-onset when they pushed the button and when they did not. However, when the light-onset became more frequent, the nondepressed participants developed an illusion of control believing their behavior was controlling the illumination of the light. That is, they overestimated how much control they had. The depressed participants, rather than underestimating their control (as they might if they felt helpless), were more accurate in their judgments than the nondepressed participants. They seemed to detect correctly the noncontingency between their responses and the outcomes. Indeed, they seemed to have an accurate, not distorted, perception of their control in the experimental task. The nondepressed participants displayed a cognitive distortion in this task rather than the depressed participants.

Dobson and Pusch (1995) repeated the Alloy and Abramson experimental design using 15 clinically depressed, 15 remitted, and 15 never-depressed subjects. Their results did not confirm the Alloy and Abramson findings. The results indicated the depressed participants overestimated their degree of control by 43% and were not more realistic than the other two groups. In fact, all three groups demonstrated positively biased distortions; however, depressed people showed neither more accuracy nor more distortion

than their nondepressed peers. The Dobson and Pusch study utilized clinically depressed patients as participants while the Alloy and Abramson study used students who reported depressive signs but who were not clinically diagnosed nor in treatment.

A number of studies have substantiated the fact that depressed participants, both students and patients, make accurate judgments in tasks of skill or of chance such as dice games (Golin, Terrell, & Johnson, 1977; Golin, Terrell, Weitz, & Drost, 1979; Smolen, 1978). It tends to be the nondepressed participants who distort reality by developing an illusion of control involving chance tasks in which their behavior is not influencing the outcome. When reinforcement is frequent, though independent of the participant's control, nondepressed people are especially likely to believe they are controlling the reinforcement (Langer, 1975a; Langer, 1975b; Miller & Ross, 1975; Tennen & Sharp, 1983; Thompson, Armstrong, & Thomas, 1998). This may, in part, explain the popularity of gambling. Vazquez (1987) found that both depressed and nondepressed participants make accurate judgments of the degree of contingency between their actions and outcomes when there is no reward, such as money, for correct judgments. When a reward was involved, the nondepressed (but not the depressed) showed an illusion of control in noncontingent (chance) situations. However, the depressed showed an illusion of control when the outcomes were negative in nature. When the outcome involved negative self-referent sentences, the depressed participants overestimated the degree of contingency between their responses and the appearance of negative self-referent sentences. That is, when negative statements about the self were the motivator instead of money, the depressed participants showed the distorted cognitions. They thought they were controlling the frequency of the negative statements. The author comments that excessive self-blame in the depressed may result in bias and distortion as they perceive the contingency between their acts and negative consequences.

Tang and Critelli (1990) studied depressive realism in mildly depressed students

using money as an incentive and employing immediate feedback and repeated tasks in order to allow participants to learn from experience. The mildly depressed made more accurate judgments and the nondepressed overestimated their control. When given feedback and further task exposure, mild depressives showed the ability to learn from experience and to modify their judgments of control; however, the nondepressives did not. The authors suggested that depressives may not be motivated by self-esteem, which is already low, while nondepressed participants may protect and enhance their self-esteem by maintaining an illusion of control. If this is true, it is certainly a flawed strategy for the nondepressed as it is likely to lead to larger disappointments and failures through denial and illusion. An experimental shift in focus to the disadvantages or the costs of taking ineffective action tends to improve the accuracy of judgments among nondepressed participants (Thompson, Armstrong, & Thomas, 1988). That is, the nondepressed seem to develop a positively distorted bias about their level of control when pursuing rewards but become more realistic and accurate when trying to avoid negative consequences.

Nelson and Craighead (1977) reported that depressed participants recalled less positive and more negative feedback than did controls in tests of memory for positive and negative feedback. This finding supports the notion of a negatively distorted bias among the depressed. However, the depressed participants were more accurate about the actual amount of negative feedback received, but the nondepressed group underestimated negative feedback. In their study, Nelson and Craighead provided both positive and negative feedback to depressed and nondepressed participants. When positive feedback was high and negative feedback was low, the depressed participants recalled feedback that was less positive and more negative than their nondepressed peers. The depressed participants were more accurate in their recall of the negative feedback, however, while the nondepressed tended to underestimate it. The authors comment that nondepressives

tend to filter out a certain amount of low frequency negative feedback, possibly to preserve their self-image. The depressed group remained more sensitive to all instances of aversive stimulation and were more fully able to recall it. In this study the depressives were more accurate about the negative but less accurate about the positive feedback, indicating that distortions may be unidirectional. While negative feedback is given an accurate amount of perception and recall, positive feedback is underestimated. The net effect is that a larger proportion of negative feedback is processed relative to its presence in the environment, though its absolute value is accurate and realistic. Negative distortions, therefore, may occur more in the relative weight assigned to incoming information than in the absolute accuracy of the information. Additionally, accuracy among the depressed may be better with negative than with positive information. In a commentary on four studies, Alloy and Lipman (1992) pointed out that depressed participants seemed to prefer an evenhanded mixture of favorable and unfavorable appraisals; the nondepressed participants, however, show a bias for favorable feedback about themselves.

Schwartz and Garamoni (1986) proposed a model of positive and negative states of mind in which they suggest that the optimal balance between positive and negative cognitions is 62% to 38%. This balance allows a healthy, adaptive person to maintain a predominantly positive state of mind while still being able to focus maximal attention on negative or threatening events. Negative events and cognitions occupy a significant, though not the greatest, proportion of their awareness in order to activate coping strategies to deal effectively with problems, dangers, and threats. The model suggests that healthy persons will allocate 38% of their cognitive and affective resources to the negative aspects of their environment, and this proportion maintains a homeostatic balance. Negative events are rendered maximally striking in order to activate adaptive responses. Negative events, while they loom large, are nevertheless perceived against a

background of predominantly positive events and perceptions in the healthy person. Schwartz and Garamoni argue against the idea that healthier people have more positive cognitions and emotions and that their greater health is characterized by higher proportions of positivity. They suggest, instead, that the healthy person maintains a 38% negative state of mind. Depression results when that proportion is exceeded. The depressed person will have a predominantly negative state of mind with the smaller proportion being allocated to positive thoughts and feelings. This model suggests that it is not only the mental recording of negative and positive events that is important but also the weight that is given to those events that determines their influence within the individual.

Martin, Abramson, and Alloy (1984) reported that depressed students tended to judge their personal control accurately in a positive outcome situation that was not really under their control. They tended to overestimate the control of another person in the same situation, however. That is, they saw others as being in control of positive outcomes in situations that were objectively outside of their control; they did not, however, consider themselves to be in control in similar situations. The judgment of the depressed participants was accurate and realistic regarding their own control of the positive outcome being offered. Nondepressed participants tended to overestimate their own control but perceive the other person's control more accurately. These results suggest that those who are depressed see themselves, accurately, as not in control in situations where they are truly not in control. However, the accuracy of their perceptions may be the highest under negative circumstances such as feeling no control in positive or favorable events, although it appears to them that others are in control of those positive events.

Alloy and Ahrens (1987) found that depressed participants were more pessimistic than nondepressed participants in predicting hypothetical future successes and failures in their lives. Both groups predicted more successes than failures for themselves, but the

depressed participants were more pessimistic in their overall forecasts for the future. The nondepressed participants tended to have a self-enhancing bias since they overestimated their probability of successes and underestimated their probability of failures relative to hypothetical others who are similar to themselves. The authors concluded that the depressed were more pessimistic than the nondepressed, but also more realistic since they foresaw their futures as being similar to those of others like themselves. The nondepressed group was more optimistic but demonstrated a self-enhancing bias in that they foresaw their futures as brighter than those of others like themselves.

In a fascinating demonstration of why it is valuable to include a measure of objective reality, Dunning and Story (1991) collected predictions for the future academic year from depressed and nondepressed college students. They found no difference between the groups in predicting positive events, but the depressed were much more likely to predict that undesirable events would occur in their futures. Although the depressed were more pessimistic in predicting negative events, an examination of the actual events that occurred after the predictions were made indicated they had still been overly optimistic. Depressed participants experienced fewer positive and more aversive outcomes than even they had anticipated. In short, the depressed were not pessimistic enough; and, as a result, the depressed were much less accurate than their nondepressed peers. The authors write, "Paradoxically, depressed subjects exhibited more unrealistic optimism than nondepressed respondents" (p. 527). An examination of actual events that followed the prediction phase of the study revealed that the depressed participants were less accurate than the nondepressed when they made optimistic predictions such as ideas that a favorable event would happen to them or an unfavorable event would not happen. The depressed group showed less accuracy when they predicted a positive event would occur. They were also less accurate when they predicted an undesirable event would not occur even though they predicted more undesirable events than the nondepressed group

did to begin with. The authors conclude the depressive realism hypothesis was not supported. They also speculate that depression may negatively influence future outcomes even more than it seems to influence, negatively, predictions of the future. Possibly the depressed lack the emotional, motivational, or social resources needed to attain the positive outcomes they desire.

In a review article, Ackermann and DeRubeis (1991) found that there were 19 studies that support the notion that the depressed are more realistic than the nondepressed. However, there are 14 published articles with findings inconsistent with the depression-realism hypothesis. They suggest that the depressed tended to be more accurate and evenhanded in those studies involving contingency judgments or self-other judgments. That is, the depressed seemed to judge their level of control more accurately than the nondepressed when contingencies that were actually outside of their control made up the experimental tasks. Likewise, the depressed made more “realistic” and evenhanded judgments when estimating the likelihood of positive and negative events occurring in the future in their own lives compared with the lives of other people. However, the nondepressed seemed to be more accurate in those studies involving the recall of evaluative, self-referential feedback.

Overly Positive Bias By the Nondepressed

A number of studies have found that the depressed do not distort in a negative direction. In fact, the depressed participants in these studies saw reality more accurately than the nondepressed participants who demonstrated a bias in an overly positive direction. The Nelson and Craighead (1977) study already mentioned found the nondepressed participants were able to filter out or disregard low levels of negative feedback and were aware of the higher level of positive feedback. The nondepressed

seemed unaware of the negative feedback that was actually present in their environment while the depressed accurately perceived it. This suggests a selective attention bias among the nondepressed that shifts (or distorts) reality in a more positive direction than is totally accurate. This was certainly demonstrated in multiple studies previously mentioned in which nondepressed subjects developed illusions of control in games of chance.

Rizley (1978) found that depressed participants rated internal factors such as ability and effort as more important causes of negative events but as less important causes of positive events. The nondepressed participants demonstrated the opposite tendency, rating internal causal factors as important in their successes (positive events). The author refers to this as a “self-serving” bias on the part of the nondepressed participants. Some writers have suggested that mastery and competence are basic human needs; and, when a person attributes successes to personal effort, yet believes that failure is due to external circumstances, the person is motivated by the need for mastery through environmental control. Liu and Steele (1986) concluded, however, that when a person is deprived of control, the attributional analysis that takes place is motivated by the desire to protect the self-image rather than to regain environmental control. The self-serving bias seems to function more to protect self-esteem than to regain environmental control through mastery and competence.

A number of studies have evaluated how the depressed and nondepressed view the future (Alloy & Ahrens, 1987; Cocker, Alloy, & Kayne, 1988). Nondepressed individuals tended to believe that positive events were more likely to happen to them than to others, but negative events were less likely to happen to them than to others. The authors refer to this as a self-enhancing cognitive bias or illusion. The depressed participants did not show this tendency to predict more positive and less negative future events for themselves compared with others, suggesting they had a more balanced,

evenhanded or statistically accurate view of the future. The authors of the studies believe nondepressed people show an unrealistic optimism about their own futures. The depressed are also more likely to predict successes than failures in their own futures, but they do not enhance their predicted futures compared with the futures they predict for others. Taylor and Brown (1988) write, "Because not everyone's future can be rosier than their peers', the extreme optimism that individuals display appears to be illusory" (p. 197). The mildly depressed as well as those with low self-esteem seemed to maintain a more balanced view of their future prospects compared with the prospects of others, suggesting their perspective is more accurate. The nondepressed, however, entertain an overly optimistic distortion, according to the authors, because they expect more positive events in their futures than in the futures of other people. There is a danger, however, in drawing research conclusions regarding what is realistic and accurate without any independent and objective measure of that reality. As the Dunning and Story (1991) study demonstrated, it may seem as though the depressed are overly pessimistic in forecasting their futures, but actual events showed them to be overly optimistic. It remains to be demonstrated whether or not the nondepressed overestimate the positives in their futures by actually measuring the positive events that occur and comparing those with the predictions that are thought to be unrealistically positive.

Taylor and Brown (1988) point out evidence that suggests nondepressed individuals have a positive view of themselves and tend to judge positive traits as more characteristic of themselves than are negative traits. They also suggest that normal people often perceive themselves as having improved on abilities that are important to them even when their performance has remained the same. In addition, nondepressed participants judge positive traits, abilities and attributes to be more characteristic of themselves than of the "average person." It seems that the nondepressed display a certain hubris with regard to their own traits and abilities. Because it is not logically possible for most people

to be better than average, Taylor and Brown add this to the evidence of a positive, or self-enhancing bias that is characteristic of the nondepressed. Because the depressed demonstrate less of this bias, they are more realistic in their judgments and perceptions, according to Taylor and Brown.

Dunning, Meyerowitz, and Holzberg (1989) point out that students, when given broad ambiguous traits on which to rate themselves, tend to apply idiosyncratic definitions which do have personal application. They also demonstrated the fact that when traits were more specifically defined, there was no tendency to overapply the trait labels in a self-serving way. This may help to explain why normal participants seem to have an overly positive bias, but it does not help us understand why there is a difference on this dimension between normals and the depressed.

A naturalistic study of homeowners living in an area devastated by brushfires (Parker, Brewer, & Spencer, 1980, as cited in Thompson, Armstrong, & Thomas, 1998), found that many homeowners stayed behind to put water on their roofs as the fire approached. Water on the roof was not effective in preventing the destruction of the homes by fire, and some homes were destroyed while others were spared. Those whose homes were not destroyed attributed more control to their actions and had significantly higher perceptions of control over avoiding future fire damage compared with those who lost their homes. The experience of failing to save their homes reduced the illusion of control while the success experience of having one's home spared increased the illusion of control. Depression or its absence were not directly assessed in this study. The naturalistic observation, however, suggests that failure feedback may be a key variable that helps produce accurate judgment in negative situations by removing illusions of control that lead to overly optimistic judgments. It may also be that depressed people have more experience with failure in their lives or are more predisposed to perceive failure, leading to higher rates of accurate judgment in negatively-toned situations.

Matute (1995) studied failure feedback as the critical variable that affects the illusion of control or its opposite, learned helplessness. She points out that the experiments that demonstrated learned helplessness with humans provided the participants with failure feedback when their responses were ineffective. That is, when the participant's responses failed to terminate a loud, unpleasant noise, the participant was fully aware of the ineffectiveness of the response because the noise continued. In addition, when the noise did stop, the yoked participants (who were in the helpless condition) were informed that their responses were not correct and the noise terminated independently of any actions on their part (failure feedback). Matute's study demonstrated the fact that learned helplessness occurs only when failure feedback is provided. When failure feedback is not provided, the participants develop the illusion of control. Thus, exactly the same situation can lead to learned helplessness or the illusion of control depending upon the availability of failure feedback to the participants. It may be that experience with failure results in a person's being more aware of negative feedback and less alert for positive or success-oriented feedback. This may be particularly true when failure involves strongly aversive consequences, and avoidance behavior is prevented or is unsuccessful.

Taylor and Brown (1988, 1994) believe the evidence for positive illusions in the nondepressed is so strong that it is an important component of mental health and psychological well-being. They suggest that a substantial amount of research documents the prevalence of healthy, adaptive illusions in normal human cognition. Their analysis of the literature consistently finds that the nondepressed possess an unrealistically positive view of the self, an exaggerated perception of personal control and an unrealistic optimism. With regard to illusions of control among the nondepressed, they observe that people often act as if they have control in situations that are determined by chance. This illusion, according to Taylor and Brown, provides a sense of personal control that is

integral to positive self-esteem. The depressed are less vulnerable to the illusion of control and also have lower levels of self-esteem. Taylor and Brown recommend that therapists foster positive illusions in their patients who are depressed so they can more closely approximate normal, healthy attitudes and functioning. Distortions in a positive direction are suggested as healthy although accurate perception of reality results in depression, according to these authors.

Alloy and Clements (1992) experimentally tested the protective value of positive illusions. They applied a negative stressor, in the form of problems that were impossible to solve, to those who showed positive illusions as well as to those who did not. This was done in a laboratory setting, and following the stressor, the participants' level of dysphoria was measured. They also followed the participants for a month after the laboratory segment of the experiment and measured their reactions to naturally occurring negative events in their lives outside of the lab. Their results suggest that those who show a greater illusion of control are less likely to show immediate negative mood effects following a failure experience in the lab. They are also less likely to show increases in depressive symptoms one month later after negative events have occurred in their lives. The authors conclude that positive illusions of control seem to provide some protection from depressive symptoms following a failure experience or following negative life events. The absence of positive illusions was a significant predictor of depressive symptoms, but the effect size was very small as this variable explained only 3-4% of the variance in depressive symptoms.

Colvin and Block (1994; Block & Colvin, 1994) argue against Taylor and Brown's contention that positive illusions foster mental health. They suggest that it is far from proven that positive illusions are characteristic of the mentally healthy or that these illusions promote health. They disagree with the conclusions of Taylor and Brown and urge researchers to include valid and objective criteria in their studies to determine the

existence of illusion or distortion. Colvin and Block believe external criteria for reality can and should be included in research designed to aid in the determination of what is realistic and what is illusion.

Negative Distortions Among the Depressed

Many studies compare the depressed with the nondepressed and find those with depression are more negative in their thoughts, perceptions, and predictions than those without depression. Similarly, those without depression tend to have greater optimism compared with the depressed participants. Many of those same studies, however, imply, but are not able to actually judge, which group is more accurate, correct, or closer to the truth. Distortions suggest a departure from the true and accurate and should not be implied without some measure of realistic judgments to compare with the “negative” or “positive” judgments of the participants. A study by Zarantonello, Johnson, and Petzel (1979) employed a task that could be measured for accuracy. They studied the accuracy of student judgment on a problem solving task. Participant groups were sorted according to D-scale scores on the MMPI. The experimenters were attempting to identify the conditions under which depressed persons might have distorted cognitions. No significant differences were found in the actual performance of the high-depressive and the low-depressive groups on anagram solving tasks. However, the high-depressive group gave lower and more inaccurate estimates of how many anagrams they correctly solved under certain conditions. The high-depressives thought they did more poorly than they actually did when a difficult task (6-letter anagrams instead of 4-letter) was combined with high ego involvement. (They were told the task was an intelligence test and that their teachers would be given the results). The two groups did not differ when the task was easy (4-letter anagrams), nor when it was difficult but carried no ego involvement pressures. The

high-depressives showed some negative distortion that was not realistically accurate (underestimating their success in problem solving) but only under conditions which involved difficulty and ego involvement together. Their actual performance, however, was not significantly lower than the nondepressed.

A number of researchers have demonstrated the fact that the depressed do show actual deficits in memory (Hartel & Hardin, 1990) and problem solving (Conway & Giannopolous, 1993). There is also some evidence to suggest that problem solving ability is an effective moderator for depression (Nezu, Kalmar, Ronan, & Clavijo, 1986). That is, effective problem solvers are less likely to become depressed even if they have a depressive attributional style. Teasdale (1983) did not deal with deficits in performance but pointed out that clinically depressed patients access negative and unpleasant memories more rapidly than positive memories. This tendency is more pronounced as depression becomes more profound. He concludes that there is a negative bias in the cognitions, especially in memories, that are available to people when in a depressed state.

Experiments using the Stroop color-naming task showed that depressed participants showed increased latencies for negative self-descriptive words (Segal, Gemar, Truchon, Guirguis, & Horowitz, 1995). Powell and Hemsley (1984) used a tachistoscope to expose depressed and control participants to unpleasant and neutral words. Recognition thresholds were individually calibrated at a 50% level for all participants. Depressed participants showed a tendency ($p = .08$) toward higher recognition of unpleasant words rather than of neutral words. Depressed persons also showed greater accuracy or selectivity for the negative and unpleasant stimuli. In a sense, the depressed participants showed inaccuracy of perception because their awareness of the unpleasant was disproportionately high although the pleasant was equally available to them.

Lobitz and Post (1979) found the performance of depressed participants on a digit

symbol task similar to the performance of the nondepressed group although the depressed had lower levels of self-expectation and lower levels of self-evaluation on the task. In a related study (Alloy, Abramson, Murry, Whitehouse, & Hogan, 1997), participants at high cognitive risk for depression demonstrated greater cognitive processing of negative self-referent information and less processing of positive self-referent information. Thus, information processing of negative self-descriptions was more involved and active among those at high risk of depression; but their attention to positive self-descriptions was less.

Social Feedback and Self-Evaluation

A number of researchers have studied the differences between the performances the depressed and the nondepressed in social situations as well as their perceptions and evaluations of their social skills. Results in the area of social performance and self-evaluation have been complex and unclear. One study that employed an independent “objective” criterion for reality measurement investigated self-ratings and observer-ratings of social competence in depressed patients, in psychiatric control patients, and in normal control participants (Lewensohn, Mischel, Chaplain, & Barton, 1980). The depressed participants rated themselves as less socially competent than the two control groups, and the objective observers agreed. The depressed group was accurate in their self-perceptions compared with the observer-ratings; the controls, however, perceived themselves more positively than others saw them. The authors concluded that the lower self-ratings of the depressed participants were not a distortion, as would be predicted by cognitive theory, since they had seen themselves similarly to the way they were seen by observers. Instead, the control groups displayed the distorted perceptions by rating themselves more positively than observers rated them on positive attributes. The self-perceptions of depressed participants were less discrepant from observer ratings than

were the self-perceptions of both the psychiatric and normal controls.

Campbell and Fehr (1990), however, altered the experimental procedure and arrived at different conclusions. They noted that observers generally rate participants less positively than do interaction partners. They also suggested that observer ratings are overly harsh. Depressed people, who tend to be harsh on themselves, appear to be rating themselves accurately when compared with observer ratings because observers are also harsh. In the Campbell and Fehr study, low self-esteem participants viewed themselves less positively and believed their interaction partners would also view them less positively. In fact, the interaction partners did not differ in their ratings of low and high self-esteem participants. Overall, the low self-esteem group was less accurate (compared with a partner-rating measure) because they underestimated the positivity of their partners' ratings. Thus, comparisons with observer-ratings tend to confirm depressive realism while comparisons with interaction-partner-ratings do not.

Colvin and Block (1994) argue that neither the depressed nor the well-adjusted were shown to be either more realistic or more accurate in their self-descriptions. The Lewensohn et al. (1980) study seemed to suggest that depressed participants were more accurate in their self-perceptions because their ratings of social competence more closely matched the ratings of observers; nondepressed group, however, overrated themselves compared with observer ratings. Colvin and Block point out, however, that the observers were told that they would be watching the interpersonal behavior of depressed individuals. They were not advised that two thirds of the participants they would be watching were not depressed. This may have biased the raters causing an overall lowering of their ratings; the result may have been that the depressed seemed to have accurate self-perceptions, but the nondepressed seemed to inflate their self-perceptions. This conjecture is supported by the fact that the observers, on average, rated all three groups as below average in social competence. Likewise, participants in all three groups

(including the depressed) rated themselves higher than the observers rated them.

Gotlib and Robinson (1982) shed an entirely different light on the matter by suggesting that the depressed are not distorting their social reality in a negative way. They are actually experiencing and helping to create a negative reality for themselves. The interaction partners of depressed participants were found to smile less, to exhibit less arousal and pleasantness in their facial expressions, and to discuss less positive and more negative content in conversation. They also made fewer statements of direct support to their depressed partners. Although the interaction partners did not rate their depressed partners lower than did their nondepressed partners, they did treat them differently in conversation. The authors suggest depressives elicit negative behaviors from others in their environment. Their more negative cognitions, then, would be an accurate reflection of the reality they help to shape. This is not dissimilar from findings that suggest marriage partners are most committed to spouses who confirm their self-view, even when it is a negative self-view (Swann, Hixon, & De La Ronde, 1997). Here, also, is evidence that depression and negative self-conceptions become self-fulfilling so that negative distortions become increasingly confirmed and increasingly accurate within the depressed person's environment.

Joiner, Alfano, and Metalsky (1992) conducted research on Coyne's interpersonal theory of depression (Coyne, 1976). In Coyne's formulation, the mildly depressed person seeks reassurance that others truly care about him. When reassurance is provided, it is reinforcing; and the depressed person increases reassurance-seeking behavior to obtain more of the reinforcement. This eventually leads to rejection which increases the depressive symptomatology. Joiner, Alfano, and Metalsky studied college students and their roommates. They found that depression was, indeed, associated with a tendency toward excessive reassurance seeking. When men (but not women) combined depression and low self-esteem with high reassurance-seeking, they were significantly more likely to

be rejected by their roommates. The depressed men with low self-esteem who did not seek reassurance were not rejected, but were found to be more likable by their roommates. Thus, for at least a subset of the depressed, social rejection is a reality rather than a distorted cognition.

Children with clear and long-standing depressive episodes evaluated themselves more negatively than did their nondepressed counterparts (Kendall, Stark, & Adam, 1990). Their teachers, acting as objective raters, did not rate the depressed children as significantly different from their nondepressed peers on measures of ability and performance. If the teachers' ratings can be considered a measure of objective reality, the depressed children demonstrated negative cognitive distortions in their self-evaluations.

In another study of social skills perceptions, depressed psychiatric inpatients expressed more dissatisfaction with their social performance than did control participants when they watched a videotape of themselves interacting with an age-matched stranger of the opposite sex (Gotlib, 1982). They also obtained lower ratings on social skill performance from objective raters suggesting that social skill deficits may be an integral part of depression. However, nondepressed inpatients showed the same level of social skill deficit, so it did not appear to be specific to depression in this study. When the social skill ratings were statistically controlled, the depressed group showed a significant deficit in self-satisfaction with their social performance. Neither was self-reward nor self-punishment the direct result of accurate performance appraisal for this group of depressed patients. The authors discussed treatments options which might target both social skill improvements and improved accuracy of depressed patients' self-evaluations. Dykman, Horowitz, Abramson, and Usher (1991) confirmed the fact that both negative cognitive distortions and actual social skill deficits were involved in the performance of depressed participants when they interacted with others.

Gotlib (1983) found depressed patients perceived social feedback as more

negative than it actually was. Both their perception and their recall of the social feedback were inaccurate in a negative direction compared with the actual feedback delivered.

Siegel and Alloy (1990) investigated the social impact of depression on the depressed person's nondepressed college roommate. They found that depressed men received negative evaluations and emotional reactions from their roommates. The depressed men also accurately perceived these negative reactions. That is, they did not negatively or positively distort their understanding of their roommates' reactions to them. Rather, depressed men accurately and correctly rated the social responses of their roommates to them. Depressed women, on the other hand, felt their roommates evaluated them more negatively than the roommates actually did. The roommates of depressed women did not evaluate them any more negatively than did the roommates of nondepressed women. In short, depressed men received negative social evaluations and perceived them. Depressed women received normal social evaluations and perceived their social impact to be more negative than it actually was. Nondepressed participants had an overly positive view about how their depressed roommates felt about them. This mixed combination of results demonstrates evidence of depressive realism (depressed men), self-enhancing positive distortions (nondepressed men and women), and negative distortions (depressed women).

Attributional Style as a Causal Factor in Depression

Peterson and Seligman (1984) have developed a dimensional theory suggesting that individuals who understand and explain negative events in terms of the dimensions of internal, stable, and global causes are prone to develop depression when negative events occur. Peterson (1992) also suggests that causal explanations for good events are independent of causal explanations for bad events. It is the internal, stable, and global

attributions that people use to explain and understand negative events that lead to depressed affect. Attributions for positive events are independent; but people with a pessimistic attributional style often tend to explain positive events in external, unstable, and specific ways. This diathesis-stress model posits internal, stable, and global attributions as the cognitive style that predisposes an individual to become depressed when faced with negative events. This cognitive style is considered to be pessimistic because the individual with this style attributes negative events to causes that are his own fault (internal), that will remain present for a long time (stable), and that affect many situations and events (global).

There are a number of studies which suggest that a depression-prone attributional style precedes the onset of depression and predicts depressive affect in response to negative events (Metalsky, Abramson, Seligman, Semmel, & Peterson, 1982; Metalsky, Halverstadt, & Abramson, 1987; Peterson & Seligman, 1984). In one study, students were asked to specify the test grade that they would consider to be low and unacceptable. The Attributional Style Questionnaire (ASQ) was used to measure their explanatory style. When test grades were distributed, explanatory style for bad events proved to be an effective predictor of increases in depressed mood for those students who received low grades (but not for students who received high grades). Seligman interprets the data to support the notion that explanatory style can predict depression in response to negative events. A study of prisoners found that explanatory style prior to imprisonment was an effective predictor of depressive symptoms at the end of imprisonment. Likewise, in a study of breast cancer in women, those who explained their cancer in terms of behavior (internal, unstable, and specific causes) were more likely to believe they were cancer free after a mastectomy. They were also more likely to be nondepressed. However, those women who explained their cancer in terms of personality (internal, stable, and global causes) tended to believe they were not cancer free after surgery; and they were more

likely to be depressed. According to the authors, these studies support the notion that a depressive explanatory style precedes and predicts the onset of depression. They believe that attributions contribute to depression and play a causal role.

DeRubeis et al. (1990) studied the treatment of depression and found that changes in attributions from pessimistic to optimistic during cognitive therapy mediated improvement in the depressed participants. Those who showed improvements in their attributional style from the beginning to the middle of therapy also showed improvements in their depression from the middle to the end of therapy.

There is also some evidence that an optimistic cognitive style correlates with success in a number of areas. Seligman and Schulman (1986) studied a population of insurance sales people and found that those with optimistic attributional styles sold 37% more insurance in their first two years on the job when compared with those who had a pessimistic attributional style. The optimistic group also tended to remain on the job at twice the rate of the more pessimistic sales people. In a related finding, optimistic students performed better in a computer programming course than those with a pessimistic style (Henry, Martinko, & Pierce, 1993). Of course, these data are correlational and cannot determine whether optimism leads to success or whether success leads to optimism.

Longitudinal research by Lewensohn, Steinmetz, Larson, and Franklin (1981) casts doubt on the idea that cognitive style or distortion precedes and predicts depression. A prospective design was used to study a large community sample of 998 people over the course of one year to determine if depression-related cognitions were causally related to depression. A variety of depression-related cognitive measures were employed. A total of 63 (6%) of the 998 participants were depressed at the time of the initial assessment and 85 (8.5%) had become depressed by the time of the one-year follow-up. Only 10% of those diagnosed as depressed were in treatment during the study. Depressed persons in

the sample did show higher expectancies for negative events and lower expectancies for positive events. In addition, they displayed irrational beliefs and low self-esteem compared with nondepressed participants. Participants who became depressed during the course of the study did not differ, however, from controls on the cognitive measures taken before the onset of their depression. That is, prior to becoming depressed, the participants did not subscribe to irrational beliefs. They had no lower expectations for positive outcomes nor higher expectations for negative outcomes. They did not tend to attribute success to external causes nor attribute failure to internal causes, and they did not perceive themselves as having diminished control. People who had a history of depression prior to the study did not differ from never-depressed controls on the cognitive measures. The authors conclude that depression-related cognitions did not precede nor predict a depressive episode, nor did depressive-cognitions remain after the remission of the depression. This is a finding replicated by a number of researchers (Blackburn, Jones, & Lewin, 1987; Dohr, Rush, & Bernstein, 1989; Lewensohn, Steinmetz, Larson, & Franklin, 1981). While depressive-cognitions did not predict depression, they did affect recovery from an episode of depression. Depressed participants with more negative cognitions were significantly less likely to improve. Cognitive distortions were not related to the etiology of depression in this large community sample because they seemed to emerge concomitantly with the episode of depression. The authors remark:

People who are vulnerable to depression are not characterized by stable patterns of negative thinking of the type postulated by the cognitive theorists. Apparently people change their expectancies and subscribe to irrational beliefs as a result of being depressed, and these cognitive changes reverse themselves as the individual recovers. (p. 218)

There are a variety of studies that demonstrate sometimes confusing and

conflicting conclusions. Berndt, Berndt, and Kaiser (1982), for instance, did not find attributional style was useful in predicting depression in college students. Handal, Gist, and Wiener (1987), however, found attributional style was correlated with depression scores for male college students but not for female students. Weinberger and Cash (1982) studied rejection for a date as an experimental situation; this was an attempt to investigate a personally meaningful situation as well as an interpersonal situation. Following their rejection, (all participants were rejected) the participants uniformly expressed more depressive affect. Their attributional style before this negative event did not, however, predict their depressive affect after the event. A number of studies have demonstrated a correlation between dysfunctional attitudes or depressive attributional style or both and depressed affect, but the depressive cognitive style disappears when the depressive symptoms abate (Hamilton & Abramson, 1983; Hollon, Kendall, & Lumry, 1986; Persons & Rao, 1985; Simons, Garfield, & Murphy, 1984). In these studies there seems to be similar improvement in cognitive style whether cognitive therapy is employed or whether cognitions are ignored and medication alone is employed to bring about improvement in depressive symptoms. Such results cast doubt on the notion that cognitions cause and maintain depression and suggest instead that negative or dysfunctional cognitions are but a symptom of depression that tend to remit as affect improves.

Because the evidence on attributional style is somewhat contradictory, Sweeney, Anderson, and Bailey (1986) conducted a meta-analysis of the relationship between attributional style and depression. They reviewed 104 studies involving nearly 15,000 participants. Their results suggested that for negative events, internal, stable, and global attributions had a reliable and significant association with depressed affect. Attributions of external, unstable, and specific causes for positive events also had a relationship with depression across studies, although this was a weaker relationship than that for negative

events and depression. The relationship between attributions and depression was consistent for both college populations and psychiatric populations.

A number of researchers believe that dysfunctional attitudes or pessimistic attributions are mood-dependent and manifest only when a person is actually in a depressed mood (Miranda & Persons, 1988; Miranda, Persons, & Byers, 1990; Peselow, Robins, Block, Barouche, & Fieve, 1990). In one study, dysfunctional attitudes improved both with successful treatment by medication and successful placebo treatment. Miranda, Persons, and Byers (1990) propose that dysfunctional beliefs are vulnerability factors for depression even though their research suggests that dysfunctional beliefs increase with a depressed mood and decrease as the mood improves. Their conclusion seems to be that dysfunctional beliefs are present but dormant and not detectable in nondepressed people. When depression occurs, the dysfunctional beliefs emerge and are reported. It is hard to conclude, however, that beliefs are a vulnerability factor and a precursor of depression if they are neither present nor detectable before the occurrence of depression.

The Role of Self-Efficacy in Depression

Albert Bandura (1997), of Stanford University, explicated a theory of self-efficacy which he described as a social cognitive theory. The theory demonstrates a strong cognitive element by virtue of Bandura's suggestion that what people believe influences their motivations, emotions, and actions much more than objective reality influences their motivations, emotions, or actions. He focuses his primary interest in peoples' beliefs about their own self-efficacy. Bandura explains that if people do not believe they can effectively do something, they have little motivation or incentive to act. Similarly, if they have the belief that they can effectively do something, they will persist and persevere in the face of repeated failures. Bandura's theory posits the fact that

efficacy beliefs are the central basis of human behavior, because without efficacy beliefs, there is little or no motivation for action.

Bandura (1997) uses the word agency to refer to acts that are done intentionally. He explains that self-efficacy involves the judgments people make with regard to their ability to perform certain actions. People will perform certain intentional actions when and if they judge themselves capable of performing those actions effectively. Without a sense of efficacy, people are unlikely to engage in the acts they believe themselves incapable of performing. If people believe they have no power to perform certain actions successfully or to attain certain results, they will not attempt to make those things happen. Peoples' beliefs in their efficacy affect virtually everything they do, think, or feel.

Depression involves perceived inefficacy to perform those actions necessary to obtain desired goals, to produce personal satisfaction, or to alter unpleasant life circumstances. The perceived inability to obtain what one longs for leads to depression. For instance, students who believe they cannot manage scholastic demands or form meaningful relationships are prone to develop depressive symptoms. Bandura (1997) believes in reciprocal influences which can produce spiraling causality. When people perceive themselves to be ineffective, they can develop a depressed mood. The depressed mood, in turn, lowers their efficacy, leading to still lower perceptions of self-efficacy. A low sense of self-efficacy to attempt to accomplish those things in life that will lead to satisfaction and a feeling of self-worth leads to depression. Likewise, depression diminishes peoples' effectiveness and lowers still further their sense of self-efficacy. Bandura suggests that depression derives from a variety of sources, including unreasonably high self-expectations, lack of social skill, negatively biased cognitive processing, and even the inability to suppress depressing ruminations. He suggests, however, that a sense of personal inefficacy is a central, common factor among all the subtypes of depression.

Bandura proposes a triadic reciprocal causation model. The three primary elements of causation in this model include behavior, internal personal factors such as thoughts and feelings, and external environmental factors. The three elements interact in ways that produce reciprocal influences. For instance, the environment clearly influences human behavior; but it is also true that humans influence and alter their environments. The influence between behavior and environment is bi-directional and reciprocal. This is how Bandura explains the reciprocal influence of mood and cognition mentioned earlier. A low sense of self-efficacy is a personal element which can alter the behavioral element. For instance, a student who believes he stands no chance of passing the final exam in a course may alter his behavior by failing to study for the exam. This lack of study-behavior is likely to lead to a poor exam grade which reciprocally influences and further lowers the student's sense of self-efficacy with regard to academic performance.

Bandura believes that depressed people tend to misperceive their own accomplishments and failures. They also tend to alter their recollections of their own performances in a negative direction. A depressed mood can alter judgments made while in that mood. In experiments in which mood was altered experimentally (Forges, Bower, & Moylan, 1990; Salovey & Bimbaun, 1989; as cited in Bandura, 1997), an induced positive mood improved perceived self-efficacy in the participants, but an induced despondent mood decreased perceptions of self-efficacy. Judgements about self-efficacy seem to be an important cognitive factor that both influence depressive mood states and are, in turn, influenced by depressive mood states.

Gender Effect

Participants have not been shown to differ based upon the variable of gender when comparing depressed with nondepressed participants in studies on judgments,

perceptions, or predictions of various criteria variables. Gotlib (1982) did not find gender a significant variable when depressed psychiatric inpatients and nondepressed hospital employees judged their own social competence during dyadic interactions with age-matched, opposite-sex strangers. Nor did Siegel and Alloy (1990) find gender a discriminating variable when studying social judgment and social perception among college students. Alloy and Clements (1992) found support for the illusion of control among the nondepressed both in real-life as well as laboratory experiments when negative events and failure experiences took place. However, the gender of the participants did not bias or affect any of the independent or dependent variables. Similarly, no gender effect was found in experiments that compared depressed with nondepressed participants in problem solving (Nezu, Kalmar, Roman, & Clavijo, 1986) or predictions of positive and negative events in their own futures (Alloy & Ahrens, 1987; Dunning & Story, 1991). Alloy and Abramson (1979) reported a series of four experiments with multiple comparisons. There was no gender effect in most of those statistical comparisons. However, they did find that nondepressed females significantly overestimated their degree of control in the 75-25 contingency condition when compared with nondepressed males. In addition, females tended to be less certain of their judgments of control than males during the 50% contingency trials. Tang and Critelli (1990) used an experimental design very similar to that of Alloy and Abramson and found that judgments of contingency were not influenced by gender. The preponderance of experimental evidence suggests there is no gender effect that influences results when comparing depressed with nondepressed participants whether they are college students or clinic patients.

Self-Report Instruments

Self-report instruments were used in this study to assess a variety of symptom-related variables. Self-report instruments have been extremely useful in aiding psychological and personality assessment. They tend to be brief and easily administered to patients, helping clinicians to gather a great deal of information in a short period of time. In addition, the patient can fill out the forms, which saves the clinician time. More of the clinician's time can then be devoted to treatment and intervention rather than to data collection through lengthy interviews with each patient. Also, scores on self-report inventories can be compared with normative data, adding an objective measure to the subjective impressions of the clinician. Over time, repeated administrations of self-report inventories can provide data-points that help track progress in treatment.

In spite of their many advantages, self-report inventories do have some limitations. One such limitation is that they do not provide accurate diagnostic information on the presence or absence of mental illness. That is, a self-report inventory is not a substitute for a diagnostic assessment by a clinician. For instance, the most widely used personality assessment tool is the MMPI (Graham, 1990). When Hathaway and McKinley first published the MMPI in 1943, they hoped it would serve as a self-report diagnostic tool. The clinical scales were designed to match the major diagnostic groups of the time. The MMPI proved to be a very valuable means of gathering information on personality characteristics. It was not, however, useful in assigning clinical diagnoses to patients. Normal people, for example, often obtained high scores on one or more of the clinical scales. Patients in any particular diagnostic group often obtained high scores on the corresponding MMPI clinical scale. However, those patients often obtained high scores on other clinical scales, as well. The result is that the clinical scales do not seem to be pure measures of the symptom dimensions suggested by the

scale names (Graham, 1990). For that reason, most psychologists refer to the clinical scales by their number rather than the scale name, to avoid confusing a personality pattern with a clinical diagnosis.

The same limitation applies to the self-report instruments that were employed in this research project. For instance, the Brief Symptom Inventory (BSI) has a number of symptom subscales; but its strength lies in the fact that it is a measure of overall mental and emotional distress (Derogatis & Savitz, 2000). There is some controversy as to whether the BSI measures separate dimensions with its subscales or measures a single dimension of psychological distress with its global index score (*GSI*). A number of authors, however, have reported that factor analysis of the BSI indicates it is most informative as a measure of general psychological distress that may derive from any number of life stress issues or diagnostic categories (Boulet & Boss, 1991; Piersma, Boes, Reaume, 1994).

One of the values of self-report instruments is that they can be used to measure symptom-change over time. This makes them useful in measuring symptom responses to various treatments in groups of patients. It is also true, however, that self-report instruments tend to measure the “state” of the symptoms at a particular time rather than measuring whether or not a person qualifies to receive a specific diagnosis. The Beck Anxiety Inventory, for instance, correlates highly with state-measures of anxiety and seems to measure the current state of anxiety symptoms rather than measuring anxiety as a trait within an individual (Creamer, Foran, & Bell, 1995).

The Beck Depression Inventory (BDI), having a moderate to high correlation with clinical ratings for psychiatric patients, has been found to detect depression as effectively as longer and more costly structured interview (Groth-Marnat, 1997). The BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) demonstrated concurrent validity with psychiatric ratings of the depth of depression in a college population (Bumberry, Oliver,

& McClure, 1978). The BDI-II was revised to be more consonant with the DSM-IV criteria defining depression. The BDI-II has been established as a valid and reliable method of identifying depression (Beck, Steer, & Brown, 1996; Groth-Marnat, 1997). In a University of Pennsylvania clinical sample, a BDI score of 17 or more has been shown to have a 93% true-positive rate and an 18% false-positive rate for the presence of major depression. Beck, Steer, & Brown, 1996). Nevertheless, some authors have argued that BDI scores are very transient and change rapidly over short intervals of time (Coyne, 1994; Coyne & Gotlib, 1983). Bumberry, Oliver, and McClure (1978) found that BDI scores for college students correlated .77 with psychiatric ratings made immediately after taking the BDI. When the psychiatric assessment was conducted from 1 to 14 days after the BDI score had been obtained, however, the correlation between the two dropped to .30. Coyne (1994) argues that self-report instruments are not an adequate substitute for a more complete assessment of the criteria for a diagnosis of depression. He points out that research using self-report instruments with college students is analog research, and researchers must be cautious when applying conclusions drawn from such research to populations of clinically depressed patients.

Past research also suggests that the use of self-report instruments is safe and harmless for the students participating in research projects. Quite a number of research projects have involved the administration of a psychological questionnaire or questionnaires just before students take an exam in school. None of these research projects have reported any adverse effects from this procedure (Folkman & Lazarus, 1985; Lay, Edwards, Parker, & Endler, 1989; Phillips & Endler, 1982; Scherer, Drumheller, & Owen, 1992).

Gathering the Clues Together

Overall it is not clear that the cognitive therapy premise which holds that depression is based upon negative cognitive distortions of reality is correct. In fact, there is evidence that suggests the depressed are more accurate in their perception and judgment, but the nondepressed have illusions of control, have a self-serving bias, or a self-enhancing bias. There is also some indication that neither the depressed nor the nondepressed are accurate in their judgments because both groups tend to overestimate their control, their social skill performance, or the positive events likely to occur in their futures. It may be that distortion varies based upon other factors such as failure feedback, the level of reward or ego involvement related to a task. The majority of the research points to the depressed having more awareness of negative events such as lack of control or of unfavorable social feedback, but it is unclear whether or not this awareness is accurate or is exaggerated in a negative way. Thus, it is difficult to be sure if the depressed are accurate in their perceptions or if they are distorting in a negative way. Likewise, it is uncertain if the nondepressed are seeing events accurately and realistically or if they have a tendency to distort in a positive direction. There is also research to suggest that the depressed are negative, and that this is an accurate reflection of their experience and their environment; however, the nondepressed are similarly positive about the more positive lives they lead. It may be that depression is an accurate assessment of a negative reality, and the nondepressed have more positive or more fortunate lives.

It is clear that research studying the cognitive distortions of the depressed and nondepressed must incorporate some independent measure of accuracy of judgment by the groups. We can make conclusions about the relative negativity of the opinions of the depressed by simply comparing them to the nondepressed, but to determine whether those negative opinions are accurate or distorted we need some criteria from which to

draw factual conclusions about accuracy and distortion. In addition, facts can be determined to be accurate or inaccurate but are neither positive nor negative in and of themselves. People can be correct or incorrect in predicting or perceiving factual data. The values implied by the labels positive and negative, however, are added when we exercise our ability to give meaning to our experience. Therefore, research on cognitive distortion must be careful to distinguish accuracy of judgment from the positive or negative evaluations of those judgments. The depressed and nondepressed should be compared with regard to the accuracy of their judgment and also with regard to the meaning they attach to those judgments.

It is also important for research to measure cognitive judgments and evaluations with regard to something that has relevance and meaning in the lives of the participants. The groundbreaking work done by Alloy and Abramson (1979) on depressive realism measured the participants' perceptions of control with regard to a light bulb turning on or off. Such a task makes an excellent experiment but has little relevance or importance in the actual lives of the participants.

This research project measured the predictions of students with regard to their own performance on an academic examination. The focus on exam performance highlights possible distortions regarding the self, which is one of the three components of Beck's cognitive triad of depression (Beck, 1967; Beck, 1996; Beck, Rush, Shaw, & Emery, 1979). Also, an exam is a task that has relevance to each student's life, having a potential reward value to each of them. Likewise, students were asked to predict and evaluate their own performances on a task that contributed to their own successes or failures in their academic careers. Each student was asked to predict a matter of fact for which the accuracy of the prediction could be measured. The factual correctness of each prediction was checked after the exams were graded in order to gauge whether or not depression or its absence correlated with distorted estimates in either a positive or

negative direction. Before the exam, the students knew how much they had studied and how well prepared they felt for the test. They had not yet seen the exam questions, however, and some uncertainty was introduced by this fact. Such ambiguity may have permitted more or less distortion, if distortion were to take place. After the exam, the students had a greater knowledge of what they knew compared with what they were asked to produce on the test. That condition created a slightly different environment in which to distort or predict accurately. The study was not designed to evaluate whether nondepressed students do better on exams than depressed students (though this was assessed). The data being sought were more closely related to whether or not depressed students had negative cognitions relative to their actual performance regardless of whether that performance was good or bad. Likewise, the data indicated whether or not nondepressed students had positive illusions relative to their actual performance regardless of whether that performance was good or bad.

The current study tested a number of hypotheses including:

Depressed students, when compared with nondepressed students, negatively distort their perceptions of reality by predicting poorer scores on an examination than they actually earn. The null version of this hypothesis is that depressed students do not differ from nondepressed students in the accuracy of their predictions of how they will score on an examination.

A second hypothesis is that depressed students evaluate the exam grades they actually earn in a more negative way, as demonstrated by a lower satisfaction, than nondepressed students who earn similar grades. The null version of this hypothesis is that depressed and nondepressed students do not differ in the satisfaction they report when receiving similar grades on an examination. There are a number of sub-hypotheses related to this overall hypothesis including:

Depressed students with high exam grades are less satisfied with their grades than

nondepressed students with high exam grades.

Depressed students with above average exam grades are less satisfied with their grades than nondepressed students with above average exam grades.

Nondepressed students with average exam grades are more satisfied with their grades than depressed students with average exam grades.

Nondepressed students with low exam grades are more satisfied with their grades than depressed students with low exam grades.

Method

Participants

Participants were college and graduate students at a state university in Central Pennsylvania. The students were tested during four consecutive semesters of the 2001 and 2002 academic years (fall, spring, summer, and fall semesters). If a professor agreed to have his or her class participate in the project, the students in that class were invited to participate voluntarily in the project. A total of five professors allowed their classes to take part in the research.

A total of 357 students (77 males and 280 females) from a rural state university served as participants in this research project. The participant population ranged in age from 17 to 55 with 84.2% of them falling between the ages of 18 and 22 (see Table 1). A total of 318 of the participants were college students and 39 of them were graduate students at the university (see Table 2). In terms of marital status, 332 (93%) of the participants were single and had never been married, 21 (5.9%) were married, and 4 (1.1%) were divorced (see Table 3). The racial and ethnic composition of the participant population is listed in Table 4. Participants were predominantly Caucasian (90.8%) with 9.2% falling into a minority category.

All of the participants were taking a psychology class when they took part in the research project. Their academic major varied, however, and students from 31 different academic majors participated (see Table 5). The largest group of participants were psychology majors who represented 51.3% of the total pool. Students who had not declared a major represented 10.1% of the study population. The remaining 138 participants represented 30 academic majors at the college or graduate level. The mean time participants reported studying for their final examination was 5.6 hours ($SD = 3.89$).

The mean final exam score among all 357 participants was 65% ($SD = 17.58$).

Table 1

Ages of Participants

<u>Age</u>	<u>Frequency</u>	<u>Percent</u>
17	1	0.3
18	39	10.9
19	74	20.7
20	91	25.5
21	63	17.6
22	34	9.5
23	13	3.6
24	12	3.4
25	3	0.8
26	3	0.8
27	3	0.8
28	4	1.1
29	1	0.3
31	1	0.3
32	2	0.6
33	1	0.3
35	1	0.3
36	1	0.3
37	1	0.3
39	1	0.3
40	2	0.6

45	2	0.6
46	1	0.3
49	1	0.3
50	1	0.3
55	1	0.3

Table 2

Academic Year In School of Participants

<u>Academic Year In School</u>	<u>Frequency</u>	<u>Percent</u>
1st year of college	70	19.6
2nd year of college	92	25.8
3rd year of college	96	26.9
4th year of college	49	13.7
5th year of college	11	3.1
1st year of graduate school	31	8.7
2nd year of graduate school	6	1.7
3rd year of graduate school	2	0.6

Table 3

Marital Status of Participants

<u>Marital Status</u>	<u>Frequency</u>	<u>Percent</u>
Single	332	93.0
Married	21	5.9
Divorced	4	1.1

Measures

Just prior to taking their final exams at the end of the semester, all students completed five psychological questionnaires. The Beck Depression Inventory-Second Edition (BDI-II) was the first of those instruments (Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report inventory for measuring the presence and severity of depression in adults and adolescents. Item content covers areas which include sadness,

Table 4

Racial and Ethnic Composition of the Participant Population

<u>Racial/Ethnic Group</u>	<u>Frequency</u>	<u>Percent</u>
Caucasian	324	90.8
African-American	17	4.8
Hispanic	11	3.1
Asian	2	0.6
Native American	1	0.3
Multiracial	2	0.6

loss of pleasure, guilt, suicidal thoughts, agitation, indecisiveness, loss of energy, and changes in sleep and appetite. The participants answer questions within the time frame of the previous two weeks in order to be consistent with criteria for Major Depressive Disorder as discussed in the DSM-IV-TR. The questionnaire takes between 5 and 10 minutes to complete. Each of the 21 items is rated on a 4-point scale ranging from 0 to 3. The minimum possible score is 0 and the maximum possible score is 63. The authors have categorized scores in the range of 0 to 13 as minimally depressed, 14 to 19 as mildly depressed, 20 to 28 as moderately depressed, and 29 to 63 as severely depressed. The

Table 5

Academic Majors of Participants

<u>Major</u>	<u>Frequency</u>	<u>Percent</u>
Psychology	183	51.3
Undeclared	36	10.1
Elementary Education	33	9.2
Communication	16	4.5
Music Education	13	3.1
Biology	9	2.5
Business Administration	9	2.5
Special Education	7	2.0
Sociology/Criminology	6	1.7
Math	6	1.7
Art	6	1.7
Social Work	5	1.4
English	3	0.8
Technical Education	3	0.8
Secondary Education	3	0.8
Commercial Art	2	0.6
Meteorology	2	0.6
Counseling	2	0.6
History	2	0.6
Philosophy	2	0.6
Sociology	1	0.3
Nursing	1	0.3
Respiratory Therapy	1	0.3

Gerontology	1	0.3
Guidance Counseling	1	0.3
Geography	1	0.3
Early Childhood Ed	1	0.3
Occupational Safety	1	0.3
Economics	1	0.3
International Studies	1	0.3
<u>Accounting</u>	1	0.3

BDI (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) demonstrated concurrent validity with psychiatric ratings of the depth of depression in a college population (Bumberry, Oliver, & McClure, 1978). The BDI-II was revised to be more consonant with the DSM-IV criteria defining depression. The BDI-II has been established as a valid and reliable method of identifying depression (Beck, Steer, & Brown, 1996; Groth-Marnat, 1997). A cutting score of 17 was used to distinguish the depressed group from the nondepressed. This score has been shown to have a 93% true-positive rate and an 18% false-positive rate for the presence of major depression in the University of Pennsylvania clinical sample (Beck, Steer, & Brown, 1996).

The Brief Symptom Inventory (BSI) was administered to obtain a global measure of distress and to obtain scores in a variety of symptom areas other than depression. The BSI is a 53-item self-report symptom inventory for measuring the presence and severity of a variety of psychological symptoms in adults and adolescents (Derogatis, 1993). Each of the 53 items is rated on a 5-point scale ranging from 0 (not at all) to 4 (extremely). When scored and profiled the BSI provides ratings in nine primary symptom dimensions and three global indices of distress. The primary symptom areas include somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic

anxiety, paranoid ideation, and psychoticism. Global indices include global severity index (*GSI*), positive symptom total (*PST*), and positive symptom distress index (*PSDI*). The questionnaire takes between 8 and 10 minutes to complete. Test participants answer the questions with reference to the time frame of the most recent seven days. The BSI depression scale has been shown to correlate highly ($r = .79, p < .001$) with the Center for Epidemiologic Studies Depression Scale (CES-D) (Amenson & Lewinsohn, 1981) and moderately ($r = .50$) with the MMPI depression scale (Boulet & Boss, 1991). Derogatis and Melisaratos (1983) have reported internal consistency Alpha coefficients for all nine symptom dimensions ranging from a low of 0.71 for psychoticism to a high of 0.85 for depression, suggesting acceptable reliability for the subscales. Test-retest reliability over a 2-week period ranged from a low of 0.68 for somatization to a high of 0.91 for phobic anxiety (Derogatis & Savitz, 2000). Moderate convergent validity with MMPI scales has been demonstrated for the BSI dimensions (Derogatis & Melisaratos, 1983). The BSI has been normed for college students (Cochran & Hale, 1985).

The Beck Anxiety Inventory (BAI) was administered to check for possible confounding effects of anxiety in the depressed participants. The BAI is a 21-item self-report inventory for measuring the presence and severity of anxiety in adults and adolescents (Beck & Steer, 1993). The questionnaire takes between 5 and 10 minutes to complete. Each of the 21 items is rated on a 4-point scale ranging from 0 (not at all) to 3 (severely; I could barely stand it). Fourteen of the BAI items represent somatic aspects of anxiety and the remaining seven items deal with subjective feelings of fear and anxiety. Test participants answer the questions within the time frame of the previous seven days. The authors have categorized scores in the range of 0 to 7 as minimal anxiety, 8 to 15 as mild anxiety, 16 to 25 as moderate anxiety, and 26 to 63 as severe anxiety. Reliability and internal consistency are quite high (Cronback coefficient alpha $> .90$); test-retest reliability is moderate to high with correlations of .60 to .75, and there is moderate to

high convergent validity with other instruments that measure anxiety ($r > .50$). The BAI was designed to measure symptoms of anxiety which are minimally shared with those of depression so as to distinguish anxiety from depression as much as possible. It performs this discrimination better than most measures of anxiety (Creamer, Foran, & Bell, 1995; Fydrich, Dowdall, & Chambless, 1992; Siegert, Walkey, & Taylor, 1992). Moderate discriminant validity ($r < .65$) has been reported between the BAI and self-reported and clinically-rated depression in both psychiatric patients and nonpsychiatric participants (Steer & Beck, 1997). Nevertheless, significant correlations between the BAI and the BDI have been reported that range from a low of .48 to a high of .61. Correlations above .60 are typically found between instruments that measure anxiety and those that measure depression, and the BAI and BDI correlations often fall below that level. Steer and Beck (1997) suggest that approximately 20% of what the BAI is measuring reflects unique aspects of anxiety that are not attributable to depression or to an overall dysphoric affect. Hewitt and Norton (1993) support the notion that the BAI and the BDI effectively measure the separate but overlapping constructs of anxiety and depression.

The Test Anxiety Scale (TAS) was administered to check for the possible confounding effects of anxiety related to the pending examination. The TAS is a 37-item, true/false, self-report inventory (Sarason, 1978). The TAS yields a score that reflects the intensity of the internal feeling of anxiety associated with taking tests and examinations. The TAS is based upon a trait-model of test anxiety and measures general anxiety about testing situations. On a scale of 0 to 37, scores ranging from 0 to 18 represent low test anxiety and scores ranging from 19 to 37 represent high test anxiety. Clark, Fox, and Schneider (1998) found the TAS to be a valid measure of test anxiety among college students. There is evidence to suggest that depressed, but not test-anxious participants, have the depressive pattern of attributions for positive and negative events. The same authors suggest that depressed and test-anxious participants have different attributional

styles (Ingram, Kendall, Smith, Donnell, & Ronan, 1987).

The Attributional Style Questionnaire (ASQ) was administered to investigate differences in the attributions between the depressed and nondepressed groups (Peterson, et al., 1982). The Questionnaire poses 12 hypothetical events and asks the respondents to imagine themselves in those situations and to rate the causes of the hypothetical events. There are six good and six bad events listed. The respondents rate the causes of the events on 7-point scales along the dimensions of internal versus external causes, stable versus unstable causes, and global versus specific causes. Separate subscales are derived for internality, stability, and globality for both good and bad events. Overall composite scores can be obtained for positive attributions (attributions for good events) and negative attributions (attributions for bad events). Sweeney, Anderson, and Bailey (1986) reported internal consistency alpha ratings of .73 for the composite score for negative events and .69 for the composite score for positive events. The ASQ is not easily faked even by participants offered a reward to answer in the most optimistic manner, nor by participants coached on what the test measures (Schulman, Seligman, & Amsterdam, 1987). The reformulated learned helplessness model of depression suggests that a depression-prone attributional style involving internal, stable, and global attributions for negative events leads to depression when negative life events occur. The ASQ is the leading measure of attributional style. Research has demonstrated a high correlation between internal/stable/global attributional style for negative events and depressive symptoms among both college students and psychiatric patients (Eschen & Glenwick, 1990; Seligman, Abramson, Semmel, & von Baeyer, 1979; Sweeney, Anderson, & Bailey, 1986). In fact, a depressive attributional style has been found to explain 48% of the variance on depression measures such as the Beck Depression Inventory (Higgins, Zumbo, & Hay, 1999).

Procedures

Professors in the psychology department of the university were approached by phone and by e-mail to inquire if they would be willing to allow their classes to participate in the research project. A face-to-face meeting was arranged with those professors who showed an interest in participating. The research project was explained in detail at those meetings. Each professor was advised that the students in their classes who agreed to participate would spend approximately one hour of class time completing the psychological instruments during the class immediately prior to the semester final exam. Then, during the class when the final exam was actually administered, the students would be asked to answer four brief questions on paper. Five of the university professors agreed to allow their classes to participate in the project.

The responsible investigator attended the last class prior to the final examination for those classes in which the professors were willing to allow the research to be conducted. The researcher read a description of the research project (see Appendix A) to the entire class. The voluntary nature of each student's participation was emphasized in the project description. Students who did not wish to participate were advised that they could leave class if they did not wish to participate, and that the remainder of the class would be occupied with the completion of the research measures and questionnaires. No student elected to leave class in order not to participate. No student who elected to participate ever dropped out at any later stage of the project.

The informed consent form (see Appendix B) was then distributed and read aloud to the students by the researcher. All students were asked to sign the informed consent form before participating in the project. Participation was completely voluntary and no coercion was employed. Any student who did not wish to participate was perfectly free to make that choice. The informed consent form explained the purpose of the research, the

expectations of the students if they decided to participate, and any potential risks or benefits of the project. The form also explained that all individual test scores would be kept confidential and shared only with those academic advisors directly involved in the research. The form explained that written results of the research would include aggregate data only and would not identify any participant individually.

All students were then asked to complete a form listing some information about themselves including name, address, gender, age, race, marital status, current year in school, academic major, and current overall grade point average (see Appendix C).

Students were then asked to complete five psychological questionnaires which would take from 33 to 55 minutes of their time to complete. The questionnaires were administered in the same order for all participants. That order was:

Beck Depression Inventory-II

Brief Symptom Inventory

Beck Anxiety Inventory

Test Anxiety Scale

Attributional Style Questionnaire

The students were advised that the instructions for each questionnaire were at the top of each form. They were given the first questionnaire and advised that they could work at their own pace while completing the forms. When they finished the first of the questionnaires they were told to bring them to the front of the room and exchange them for the second. As they finished each of the questionnaires, they turned them in and were given the next until they had completed all five. The students were free to go when they completed all five of the psychological questionnaires.

Immediately prior to taking the final exam for the course, the students were asked to write down the amount of time they spent studying for the exam. They were also asked to predict the grade (as a percentage) that they expected to obtain on the exam. This

question was posed on paper to the students as follows:

Please write down the percentage score you believe you will earn on the exam you are about to take. Your estimate will not be shown to the course instructor or to anyone at the university.

Following the exam and before they left the examination room, students were asked to estimate the grade (as a percentage) that they believed they obtained on the examination they had just completed. This question was posed on paper to the students as follows:

Please write down the percentage score you believe you earned on the exam you just completed. Your estimate will not be shown to the course instructor or to anyone at the university.

When the exam was scored, the responsible investigator told each student his or her score. Each student was then asked to rate the grade he or she received either as Highly Satisfactory, Moderately Satisfactory, Satisfactory, Somewhat Unsatisfactory, or Highly Unsatisfactory. As with the previous questions, this assessment was posed to each student with a promise not to show the satisfaction levels to any university personnel. Whereas the previous questions required each participant to make an estimate related to a numerical (but as yet unknown) piece of data, this question then made a value judgment regarding a known piece of data. Taken together, the questions called for accuracy or distortion with regard to matters of fact and for evaluations on the qualitative meaning of those facts. Some students, for instance, may have obtained an 85% and found that highly satisfactory while others may have found an 85% to be unsatisfactory.

The investigator scored the psychological questionnaires and contacted students who reported “dangerous symptoms” on the questionnaires; this was done by mail within one week of their final exam. Dangerous symptoms were operationally defined to include:

The following answers on question number nine in the BDI-II:

1. I have thoughts of suicide but I would not carry them out.
2. I would like to kill myself.
3. I would kill myself if I had the chance.

Answers on the BSI of “a little bit”, “moderately”, “quite a bit”, or “extremely”

to:

Question 9 -- Thoughts of ending your life

Question 40 -- Having urges to beat, injure, or harm someone

BDI-II depression score in the severe range (29 to 63)

Any students who gave the responses listed above received a letter in the mail from the investigator informing them of their answers which had raised concerns, reminding them of their opportunity to seek professional assistance through the university counseling center (see Appendix D for example of letter sent to students).

Results

Analysis of the data revealed there was a significant negative correlation between score on the Beck Depression Inventory-II (BDI-II) and actual final exam score [$r(357) = -.149, p < .01$]. Thus, higher levels of depressive symptoms correlated with lower exam scores. Those with lower levels of depressive symptoms tended to obtain better exam scores.

Group Comparisons

Using a cutting score of 17 on the BDI-II, participants were divided into two groups. The depressed group (D) was operationally defined as those who obtained a score of 17 or greater on the BDI-II while the nondepressed group (ND) was operationally defined as those who obtained a score of 16 or less. There were 43 subjects in the depressed group and 314 in the nondepressed group. The two groups were not significantly different in terms of gender, $\chi^2(1, N = 357) = 1.68, p = .20$, marital status, $\chi^2(2, N = 357) = 1.72, p = .43$, academic major, $\chi^2(31, N = 357) = 12.60, p = .999$, year in school, $\chi^2(7, N = 357) = 5.13, p = .64$, age, $t(355) = -1.08, p = .28$, (2-tailed), or grade point average, $t(294) = 1.33, p = .18$, (2-tailed). There was a significant difference between the D and ND groups in the variable of race, $\chi^2(5, N = 357) = 18.15, p = .00$, with Caucasians showing higher levels of depressive symptoms. The difference in racial or ethnic composition of the groups is not surprising since the Epidemiologic Catchment Area (ECA) study of depression found a lower prevalence of depression among African-Americans and Hispanics than among Caucasians (Kaelber, Moul, & Farmer, 1995). It is somewhat surprising that the groups are not significantly different in terms of gender since the ECA study also found a higher prevalence of depression among females than

among males.

The mean final exam score for the D participants was 58% while the mean exam score for the ND participants was 66%. This difference was significant, $t(355) = 2.87, p < .004$, (2-tailed), suggesting that depressed participants earn significantly poorer exam scores than their nondepressed classmates. The central focus of the study, however, was to investigate differences in predictions of exam scores not differences in actual exam scores.

Testing the Hypotheses

The differences between predicted and earned exam scores.

The absolute differences between the scores participants predicted that they would earn before they took the exam, the scores they predicted that they would earn immediately after they took the exam, and their actual exam scores were calculated (see Table 6). These absolute differences between predicted scores and actual scores were then compared for the D and ND groups. The results suggested that there was no significant difference in the accuracy of the predictions (the absolute difference between the predicted score and the actual score) made by D and ND participants before they took the examination, $t(355) = -1.61, p < .11$, (2-tailed). Likewise, there was no significant difference in the accuracy of the predictions made by D and ND participants after they took the examination, $t(355) = -1.74, p < .08$, (2-tailed).

Because there were so many more nondepressed participants ($N = 314$) than depressed participants ($N = 43$), two matched groups of data were developed for analysis. Depressed participants were matched for actual exam score with nondepressed participants, creating two groups, each containing 43 participants. This allowed the

predicted exam scores of depressed and nondepressed participants who earned exactly the same actual exam scores to be compared. The participants in the D and ND groups in this matched sample were not significantly different in terms of gender, race, marital status, year in school, academic major, age, or grade point average. The mean predicted exam scores for the depressed and nondepressed participants in the matched groups are presented in Table 7. The mean exam score predictions before they took the exam were not significantly different for the D and ND groups in the matched samples, $t(84) = .924$, $p < .36$, (2-tailed). The mean exam score predictions after they took the exam were also not significantly different, $t(84) = .898$, $p < .37$, (2-tailed).

Table 6

Mean Absolute Differences Between Predicted Exam Scores and Actual Exam Scores

Time of Prediction	Depressed Group		Nondepressed Group	
	M	SD	M	SD
Pre-exam prediction				
difference	18.14	12.93	14.82	12.65
Post-exam prediction				
difference	14.07	11.46	11.24	9.78

The mean absolute differences between the scores participants predicted that they would earn before they took the exam, the scores that they predicted they would earn after they took the exam, and their actual scores were calculated (see Table 8). Those absolute differences between predicted scores and actual scores were then compared for the D and ND groups. The results suggest there was no significant difference in the accuracy of the predictions (the absolute difference between the predicted score and the actual score) made by the D and ND participants before they took the examination, $t(84)$

= .028, $p < .98$, (2-tailed). The results also suggest there was no significant difference in the accuracy of the predictions made by the D and ND participants after they took the examination, $t(84) = -.132$, $p < .90$, (2-tailed).

An analysis was conducted to determine if the BDI-II score (as a continuous variable) was correlated with exam score predictions made before the exam and after the exam. There was no significant correlation between BDI-II score and exam score predictions made before taking the exam [$r(86) = -.152$, $p > .05$] or after taking the exam [$r(86) = -.147$, $p > .05$]. These results suggest that higher BDI-II scores did not significantly correlate with lower predicted exam scores. Likewise, lower BDI-II scores did not significantly correlate with higher predicted exam scores. In addition, fewer reported symptoms of depression, as reported on the BDI-II, did not significantly correlate with the absolute difference between the predicted exam score and the actual exam score for predictions made before the exam [$r(86) = -.066$, $p > .05$] or after the exam [$r(86) = -.071$, $p > .05$]. That is, depressive symptom level did not seem to correlate with the accuracy of the participants' predictions of their exam scores.

Table 7

Mean Exam Scores Predicted by Participants in Matched Sample

Time of Prediction	Depressed Group		Nondepressed Group	
	M	SD	M	SD
Pre-exam prediction	72%	11.18	75%	13.35
Post-exam prediction	68%	12.55	70%	13.24

Table 8

Mean Absolute Differences Between Predicted Exam Scores and Actual Exam Scores for the Matched Samples

Time of Prediction	Depressed Group		Nondepressed Group	
	M	SD	M	SD
Pre-exam prediction difference	18.14	12.93	18.22	13.72
Post-exam prediction difference	14.07	11.46	13.76	10.57

The direction of predictions of exam scores.

The hypothesis being investigated was that increased depressive symptoms would influence the accuracy of a participant's exam score prediction in a negative direction. Therefore, the directions of the inaccurate predictions were analyzed. In the matched sample, 14 people underpredicted their actual exam scores during their preexam prediction, while 72 overestimated the exam scores they would earn. It is interesting to note that 84% of the sample overpredicted their exam scores. Table 9 shows the number of depressed and nondepressed participants who underpredicted their exam scores and who overpredicted their exam scores. A Chi-square analysis showed no significant relationship between membership in the depressed group or nondepressed group and the tendency to underpredict or overpredict the exam scores, $\chi^2(1, N = 86) = .341, p < .56$. This suggests that depressed and nondepressed participants are not significantly different in their tendency either to underpredict their exam scores or to overpredict their exam scores. A second analysis of the direction of the error of prediction was conducted which included participants who accurately predicted their exact exam scores in addition to

those who over and under predicted their scores. Only two of the nondepressed participants correctly predicted their exact actual exam scores and none of the depressed participants predicted their correct actual score. A Chi-square analysis again showed no significant relationship between membership in the depressed or nondepressed group and the tendency to underpredict, accurately predict, or overpredict actual exam scores, $\chi^2(2, N = 86) = 3.39, p < .18$.

One interesting finding when studying the full sample of 357 participants was that amount of study time and the actual exam score did not correlate [$r(357) = -.061, p > .05$].

Table 9

Number of Participants Who Underpredicted and Overpredicted Exam Scores in the Matched Sample

<u>Direction of Prediction</u>	<u>Depressed Group</u>	<u>Nondepressed Group</u>
Underprediction	8	6
Overprediction	35	37

The mean amount of study time was 5.6 hours (SD 3.89). This finding suggests that increased study time for the exam did not correlate with a higher score on the exam. Likewise, decreased study time did not correlate with a lower score on the exam.

Levels of satisfaction with exam scores.

Participants were asked to rate their level of satisfaction with their actual exam score on a 5-point scale (highly satisfied, moderately satisfied, satisfied, somewhat unsatisfied, highly unsatisfied). One of the hypotheses of the study was that depressed participants would be less satisfied than nondepressed participants with equivalent exam

scores. Table 10 displays the number of participants who scored at each percentage level on the exam. Analysis of the data revealed a number of findings. Level of satisfaction increased consistently as exam score increased. For example, participants with exam scores of less than 40% tended to be highly dissatisfied while participants with scores between 91% and 100% tended to be highly satisfied. There was a significant effect for the level of performance on the exam (the actual exam score) and the level of satisfaction with the score, $F(6, 357) = 53.77, p = .000$. A univariate analysis of variance posthoc Scheffé test indicated higher satisfaction with good scores (61% or more) and lower satisfaction with poor scores (60% or less) ($p = .000$). Mood (depressed versus nondepressed) did not significantly alter satisfaction with exam score level, $F(1, 357) = .374, p = .541$. That is, the satisfaction levels of depressed participants were similar to the satisfaction levels of nondepressed participants across the full range of exam scores. Likewise, the interaction of the mood variable (D versus ND) and exam score level did not significantly alter satisfaction, $F(5, 357) = .373, p = .867$. This finding offers no support to the notion that depressed participants would be less satisfied than nondepressed participants who earn similar exam scores.

Predictions related to good exam scores and to poor exam scores.

Another hypothesis that was explored was the possibility that depressed participants have negative cognitive distortions in a somewhat selective manner. For example, is it possible that depressed people have negative cognitive distortions when experiencing positive events but are accurate in their perceptions of negative events? To investigate this hypothesis, exam scores were divided into “good” scores and “poor” scores. Scores were considered “good” (positive event) if they were 61% or better and “poor” (negative event) if they were 60% or less. Two factors were considered in making

Table 10

Exam Scores and Numbers of Participants at Each Level

<u>Exam score range</u>	<u>Number of participants in that score range</u>
<40%	40
41-50%	46
51-60%	51
61-70%	63
71-80%	80
81-90%	60
91-100%	17

this division. The average score for all students on their exams was 65%. More importantly, the level of satisfaction with the exam grade was significantly higher for those participants who earned 61% or better when compared with those who earned 60% or less. Since student satisfaction was significantly higher for scores of 61% or higher, those scores were considered to be a positive event.

The level of exam score performance (good versus poor) had a significant effect on exam score predictions made by both depressed and nondepressed participants before they took their exam. The mean difference between the predicted exam score and the actual exam score for nondepressed participants who did poorly on the exam was 25.70 (*SD* 13.45). The mean difference between the predicted exam score and the actual exam score for the depressed participants who did poorly on the exam was 25.30 (*SD* 13.41). The mean difference between the predicted exam score and the actual exam score for the nondepressed participants who did well on the exam was 9.63 (*SD* 7.84). The mean difference between the predicted exam score and the actual exam score for the depressed participants who did well on the exam was 9.90 (*SD* 5.25). Clearly the students who did

poorly on the exam had a greater prediction error than those students who did well on the exam, for predictions made prior to taking the exam. Mood, however, did not influence the prediction error, $F(1, 86) = .001, p = .980$. That is, depressed students who did poorly on the exam tended to have the same level of prediction error as nondepressed students who did poorly on the exam. Likewise, depressed students who did well on the exam tended to have the same level of prediction error as nondepressed students who did well on the exam. The interaction of mood (D versus ND) and exam score level (good versus poor) also did not influence exam score predictions, $F(1, 86) = .020, p = .887$.

Similar results were obtained for exam score predictions made after taking the exam. The mean difference between the predicted exam score and the actual exam score for nondepressed participants who did poorly on the exam was 18.70 ($SD 11.92$). The mean difference between the predicted exam score and the actual exam score for depressed participants who did poorly on the exam was 19.54 ($SD 12.21$). The mean difference between the predicted exam score and the actual exam score for nondepressed participants who did well on the exam was 8.08 ($SD 4.38$). The mean difference between the predicted exam score and the actual exam score for the depressed participants who did well on the exam was 7.78 ($SD 6.28$). Again, the students who did poorly on the exam had greater levels of prediction error than the students who did well on the exam. Mood, again, did not influence the prediction error, $F(1, 86) = .018, p = .90$. The interaction of mood (D versus ND) and exam score level (good versus poor) also did not influence the exam score predictions, $F(1, 86) = .077, p = .78$.

Interesting correlations that emerged.

The central hypotheses of this study were not supported by the findings. It did not appear that depressed participants differed from nondepressed participants in the

accuracy of their predictions related to their final exam scores. Data on a variety of other variables that were peripheral to the central hypotheses of this study were obtained in the course of the research. A correlational matrix was calculated for those variables (see Table 11). These findings will be reported as a matter of interest, but must be interpreted with some caution because calculating multiple correlations on multiple factors will yield some significant correlations purely by chance. The chances of making a Type I error, or rejecting the null hypothesis when it is true, increase with the calculation of multiple correlations.

BDI-II score and attributional style were negatively correlated [$r(357) = -.318, p < .01$]. This suggests that higher depression scores are correlated with more negative attributional style. This finding is consistent with the research on attributional style.

Age and overall grade point average were positively correlated [$r(296) = .239, p < .01$]. This correlation suggests that older students tended to have higher grade point averages. Amount of time spent studying for the final exam also correlated with age [$r(357) = .154, p < .01$]. Taken together these findings suggest that older students tend to spend more time studying for their final exams and this tends to be reflected in higher overall grade point averages.

Overall grade point average and score on the Test Anxiety Scale were negatively correlated [$r(296) = -.203, p < .01$]. This finding suggests that as the level of test anxiety increases, grade point average decreases. Actual exam score and score on the Test Anxiety Scale also negatively correlated [$r(357) = -.258, p < .01$]. In an interesting finding, the amount of time spent studying for the final exam and the score on the Test Anxiety Scale were positively correlated [$r(357) = .213, p < .01$]. Taken together, these findings suggest that test anxious participants spend more time studying for exams but obtain poorer exam scores and poorer GPA's than their non-test anxious counterparts.

Higher GPA correlated with higher exam score prediction error for both

Table 11
Correlations for Variables Separate from the Central Hypotheses

	Age	Grade Point Average	BAI	TAS
Age	1.00	.24**	.01	.08
Grade Point Average	.24**	1.00	-.04	-.20*
BAI	.01	-.04	1.00	.50**
TAS	-.08	-.20**	.50**	1.00
BSI Somatization	.02	-.05	.72	.36**
BSI Obsessive Compulsive	-.00	-.10	.61**	.47**
BSI Interpersonal Sensitivity	-.02	-.04	.46**	.38**
BSI Depression	-.04	-.06	.54**	.40**
BSI Anxiety	.08	.02	.68**	.43**
BSI Hostility	.02	-.10	.54**	.33**
BSI Phobic Anxiety	-.04	.00	.44**	.28**
BSI Paranoid Ideation	-.00	-.13*	.49**	.38**
BSI Psychoticism	.07	*.07	.50**	.35**
BSI Global Severity Index	.03	-.10	.68**	.49**
BSI Positive Symptom Total	.02	-.09	.67**	.50**
BSI Positive Symptom Distress	.01	-.09	.62**	.34**
ASQ	.01	-.02	-.03	-.10
Study time	.15**	-.07	.08	.21**
Exam Score	.02	.51**	-.04	-.26*
Pre-Exam Prediction	.05	.29**	-.10	-.2**
Post-Exam Prediction	-.00	.28**	-.09	-.23*

* Significant at .05 level

**Significant at .01 level

Table 11
Correlations for Variables Separate from the Central Hypotheses

	BSI Somatization	BSI Obsessive Compulsive
Age	.02	-.00
Grade Point Average	-.05	-.10
BAI	.72**	.61**
TAS	.36**	.47
BSI Somatization	1.00	.49**
BSI Obsessive Compulsive	.49**	1.00
BSI Interpersonal Sensitivity	.40**	.58
BSI Depression	.43**	.64**
BSI Anxiety	.57**	.62**
BSI Hostility	.51**	.58
BSI Phobic Anxiety	.39**	.44**
BSI Paranoid Ideation	.41**	.58**
BSI Psychoticism	.41**	.59**
BSI Global Severity Index	.64**	.82**
BSI Positive Symptom Total	.64**	.81**
BSI Positive Symptom Distress	.57**	.68**
ASQ	-.01	-.11**
Study time	.04	.01
Exam Score	-.05	-.02
Pre-Exam Prediction	-.08	-.15**
Post-Exam Prediction	-.05	-.14**

* Significant at .05 level

**Significant at .01 level

Table 11
Correlations for Variables Separate from the Central Hypotheses

	BSI Interpersonal Sensitivity	BSI Depression
Age	-.02	.04
Grade Point Average	-.04	-.06
BAI	.46**	.54**
TAS	.38**	.40**
BSI Somatization	.40**	.43**
BSI Obsessive Compulsive	.58**	.64**
BSI Interpersonal Sensitivity	1.00	.64**
BSI Depression	.64**	1.00
BSI Anxiety	.52**	.56**
BSI Hostility	.52**	.64**
BSI Phobic Anxiety	.51**	.44**
BSI Paranoid Ideation	.62**	.63**
BSI Psychoticism	.66**	.79**
BSI Global Severity Index	.75**	.80**
BSI Positive Symptom Total	.75**	.80**
BSI Positive Symptom Distress	.61**	.63**
ASQ	-.27**	-.28**
Study time	-.01	.09
Exam Score	-.04	-.04
Pre-Exam Prediction	-.11*	-.06
Post-Exam Prediction	-.12*	-.09

* Significant at .05 level

**Significant at .01 level

Table 11
Correlations for Variables Separate from the Central Hypotheses

	BSI Anxiety	BSI Hostility	BSI Phobic Anxiety
Age	.08	.02	-.04
Grade Point Average	.02	-.10	.00
BAI	.68**	.54**	.44**
TAS	.43**	.33**	.28**
BSI Somatization	.57**	.51**	.39**
BSI Obsessive Compulsive	.62**	.58**	.44**
BSI Interpersonal Sensitivity	.52**	.52**	.51**
BSI Depression	.56**	.64**	.44**
BSI Anxiety	1.00	.55**	.48**
BSI Hostility	.55**	1.00	.40**
BSI Phobic Anxiety	.48**	.40**	1.00
BSI Paranoid Ideation	.52**	.57**	.41**
BSI Psychoticism	.56**	.58**	.47**
BSI Global Severity Index	.75**	.74**	.56**
BSI Positive Symptom Total	.77**	.74**	.56**
BSI Positive Symptom Distress	.58**	.64**	.51**
ASQ	-.18**	-.19**	-.16**
Study time	.15**	.07	.05
Exam Score	.03	-.02	-.03
Pre-Exam Prediction	-.01	-.09	-.01
Post-Exam Prediction	.00	-.01	-.04

* Significant at .05 level

**Significant at .01 level

Table 11
Correlations for Variables Separate from the Central Hypotheses

	BSI Paranoid Ideation	BSI Psychoticism
Age	-.00	.07
Grade Point Average	-.13*	-.07
BAI	.49**	.50**
TAS	.38**	.35**
BSI Somatization	.41**	.41**
BSI Obsessive Compulsive	.56**	.59**
BSI Interpersonal Sensitivity	.62**	.66**
BSI Depression	.63**	.79**
BSI Anxiety	.52**	.56**
BSI Hostility	.57**	.58**
BSI Phobic Anxiety	.41**	.47**
BSI Paranoid Ideation	1.00	.66**
BSI Psychoticism	.66**	1.00
BSI Global Severity Index	.73**	.78**
BSI Positive Symptom Total	.74**	.77**
BSI Positive Symptom Distress	.60**	.65**
ASQ	-.13*	-.28**
Study time	.07	.05
Exam Score	-.08	-.06
Pre-Exam Prediction	-.10	-.08
Post-Exam Prediction	-.08	-.10

*. Significant at .05 level

**Significant at .01 level

Table 11
Correlations for Variables Separate from the Central Hypotheses

	BSI Global Severity Index	BSI Positive Symptom Total
Age	.03	.02
Grade Point Average	-.10	-.09
BAI	.68**	.67**
TAS	.49**	.50**
BSI Somatization	.64**	.64**
BSI Obsessive Compulsive	.82**	.81**
BSI Interpersonal Sensitivity	.75**	.75**
BSI Depression	.80**	.80**
BSI Anxiety	.75**	.77**
BSI Hostility	.74**	.74**
BSI Phobic Anxiety	.56**	.56**
BSI Paranoid Ideation	.73**	.74**
BSI Psychoticism	.78**	.77**
BSI Global Severity Index	1.00	.96**
BSI Positive Symptom Total	.96**	1.00
BSI Positive Symptom Distress	.78**	.69**
ASQ	-.26**	-.24**
Study time	.06	.07
Exam Score	-.04	-.03
Pre-Exam Prediction	-.09	-.09
Post-Exam Prediction	-.11*	-.10

* Significant at .05 level

**Significant at .01 level

Table 11
Correlations for Variables Separate from the Central Hypotheses

	BSI Positive Symptom Distress	ASQ
Age	.01	.02
Grade Point Average	-.09	-.04
BAI	.62**	-.22**
TAS	.34**	-.22**
BSI Somatization	.57**	-.15**
BSI Obsessive Compulsive	.68**	-.24**
BSI Interpersonal Sensitivity	.61**	-.72**
BSI Depression	.63**	-.28**
BSI Anxiety	.58**	-.18**
BSI Hostility	.64**	-.19**
BSI Phobic Anxiety	.51**	-.16**
BSI Paranoid Ideation	.60**	-.13**
BSI Psychoticism	.65**	-.28**
BSI Global Severity Index	.78**	-.26**
BSI Positive Symptom Total	.69**	-.24**
BSI Positive Symptom Distress	1.00	-.21**
ASQ	-.22**	1.00
Study time	-.01	-.01
Exam Score	-.10	+.06
Pre-Exam Prediction	-.16**	.02
Post-Exam Prediction	-.14**	.04

* Significant at .05 level

**Significant at .01 level

Table 11
Correlations for Variables Separate from the Central Hypotheses

	Study Time	Exam Score
Age	.15**	.12
Grade Point Average	-.07	.15**
BAI	.08	-.04
TAS	.21**	-.26**
BSI Somatization	.04	-.05
BSI Obsessive Compulsive	.01	-.02
BSI Interpersonal Sensitivity	-.01	-.04
BSI Depression	.09	-.04
BSI Anxiety	.15**	.03
BSI Hostility	.07	-.02
BSI Phobic Anxiety	.05	-.03
BSI Paranoid Ideation	.07	-.08
BSI Psychoticism	.05	-.06
BSI Global Severity Index	.06	-.04
BSI Positive Symptom Total	.07	-.03
BSI Positive Symptom Distress	-.01	-.10
ASQ	-.01	-.06
Study time	1.00	-.06
Exam Score	-.06	1.00
Pre-Exam Prediction	.10	.54**
Post-Exam Prediction	-.00	.70**

* Significant at .05 level

**Significant at .01 level

Table 11
Correlations for Variables Separate from the Central Hypotheses

	Pre-Exam Prediction	Post-Exam Prediction
Age	.05	-.00
Grade Point Average	.29**	.28**
BAI	-.10	-.09
TAS	-.21**	-.23**
BSI Somatization	-.08	-.05
BSI Obsessive Compulsive	-.15**	-.14**
BSI Interpersonal Sensitivity	-.11*	-.12**
BSI Depression	-.06	-.09
BSI Anxiety	.01	.00
BSI Hostility	-.09	-.01
BSI Phobic Anxiety	-.01	-.04
BSI Paranoid Ideation	-.10	-.08
BSI Psychoticism	-.08	-.10
BSI Global Severity Index	-.09	-.11*
BSI Positive Symptom Total	-.09	-.10
BSI Positive Symptom Distress	-.16**	-.14**
ASQ	.02	.04
Study time	.10	.00
Exam Score	.54**	.70**
Pre-Exam Prediction	1.00	.74**
Post-Exam Prediction	.74**	1.00

* Significant at .05 level

**Significant at .01 level

predictions made before taking the exam [$r(357) = .290, p < .01$] and after taking the exam [$r(357) = .278, p < .01$]. Since the majority of participants tended to overestimate the exam score they would earn, the participants with the higher GPA's tended to overestimate their exam scores more than did the participants with the lower GPA's. Interestingly, Test Anxiety Scale scores tended to moderate the tendency to overestimate exam scores. Test anxiety was negatively correlated with prediction error. The higher the test anxiety, the lower the prediction error for predictions made before the exam [$r(357) = -.213, p < .01$] and after taking the exam [$r(357) = -.227, p < .01$].

Not surprisingly, exam score and grade point average were correlated [$r(357) = .514, p < .01$]. Clinical measures also tended to correlate. The Beck Anxiety Inventory scores correlated with the Test Anxiety Scale scores [$r(357) = .502, p < .01$]. Both the Beck Anxiety Inventory [$r(357) = .682, p < .01$] and the Test Anxiety Scale [$r(357) = .492, p < .01$] correlated with the Global Severity Index of the Brief Symptom Inventory. A positive attributional style, as measured by the Attributional Style Questionnaire, was negatively correlated with scores on the Beck Anxiety Scale [$r(357) = -.223, p < .01$], the Test Anxiety Scale [$r(357) = -.217, p < .01$], and the Global Severity Index of the Brief Symptom Inventory [$r(357) = -.263, p < .01$].

Marital status, $F(2, 356) = 1.55, p = .21$ for predictions made before the exam and $F(2, 356) = 1.96, p = .14$ for predictions made after the exam, and gender, $F(1, 356) = .71, p = .40$ for predictions made before the exam and $F(1, 356) = 1.55, p = .21$ for predictions made after taking the exam, did not significantly influence predictive accuracy. The participant's year in school did influence prediction error for exam score predictions made before, $F(7, 357) = 7.75, p < .00$, and after, $F(7, 357) = 5.27, p < .00$, taking the exam. Posthoc analysis revealed that juniors and seniors in college were much more likely to predict their exam scores inaccurately than were freshmen ($p = .000$) and sophomores ($p = .002$).

Discussion

The present study attempts to understand the accuracy of judgments made by depressed and by nondepressed participants in order to know if negative cognitive distortions would be characteristic of the depressed participants. One strength of the study is that it compares the judgments of depressed and of nondepressed participants using an objective measure of reality (exam score) as the criterion for determining if cognitions are distorted or accurate. Another strength of the study is that it compares an estimate of future performance with an estimate of immediate past performance and compares both estimates with actual measurable performance. In addition, both depressed and nondepressed participants evaluated their actual performance when they knew what exam score they had earned. This step in the research allows us to see if depressed participants negatively distort their evaluations of their performance regardless of whether or not they distort their estimate of their performance. The task being evaluated was one which had personal meaning in the lives of the participants. Unlike experiments in which participants are asked to solve anagrams or estimate their control of a light bulb turning on or off, these participants were asked to predict and evaluate their performance on a task which was relevant to their success or failure in school. Such a task has implications for a participant's self-assessment of personal qualities such as competence, intelligence, and effort.

The results of this study do not support the notion that depressed students have negative cognitive distortions of reality when compared with nondepressed students. Both depressed and nondepressed students tended to overestimate the scores they would earn on a college or graduate school final exam, and the two groups were not significantly different in their predictions of the scores they would earn.

The differences between predicted and earned exam scores.

A number of different approaches to the data were carried out. The absolute differences between the exam scores that participants predicted they would earn and the exam scores they actually earned were calculated and compared for the depressed and the nondepressed participants. There was no significant difference between the depressed and the nondepressed groups in this measure of their predictive accuracy.

Because there were so many more nondepressed participants (N=314) in the full sample than depressed participants (N=43), there was some concern that a true difference between the groups might be masked by the preponderance of nondepressed participants in the pool. Therefore, matched groups of depressed and nondepressed participants were created, each containing 43 participants. Using this matched-sample data, the absolute differences between the exam scores participants predicted that they would earn and the exam scores that they actually earned were calculated and compared for the depressed and nondepressed groups. There was no significant difference between the depressed and the nondepressed groups in this measure of their predictive accuracy.

The analysis of the absolute difference data for both the full sample and the matched-group sample suggests that there is no difference between depressed and nondepressed students in the accuracy of their exam score predictions. Neither group showed themselves to be more accurate or less accurate because the accuracy of their predictions was so similar. In other words, the depressed participants did not distort in an overly negative way compared with the nondepressed. Likewise, the nondepressed did not distort in an overly positive way compared with the depressed. Inaccuracy of prediction, which can also be thought of as distortion, was similar for both groups; and both groups tended to be highly overly optimistic in predicting the exam scores they expected.

The BDI-II score itself (without using the score to divide participants into depressed and nondepressed groups) was analyzed along with exam score predictions made both before and after taking the examination. There was no significant correlation between BDI-II score and exam score predictions made either before or after taking the examination. This result suggests that higher BDI-II scores, which represent higher levels of depressive symptoms, do not significantly correlate with lower predicted exam scores. The more depressed participants did not seem to distort reality by expecting to obtain lower exam scores. Likewise, the less depressed participants did not seem to distort reality by predicting higher exam scores. Nor did The BDI-II score, viewed as a continuous variable, correlate with the absolute difference between the predicted exam score and the actual exam score. Thus, depressive symptom level did not correlate with absolute difference scores as a measure of predictive accuracy.

The direction of predictions of exam scores.

Because cognitive distortions may influence not only the direction of predictive inaccuracy, but also the amount of predictive inaccuracy, the direction of the participants' predictive inaccuracies was also analyzed. For example, cognitive theory not only suggests that depressed participants will make inaccurate predictions but also that their inaccuracies will be in a negative direction. Statistical analysis showed no difference between depressed and nondepressed participants in their tendencies to underpredict, overpredict or accurately predict their exam scores. The majority of participants in both groups tended to overestimate the scores they would obtain on the final examination, and neither the depressed nor the nondepressed participants were significantly different in this tendency to overestimate.

Predictions related to good exam scores and to poor exam scores.

Because depressed participants may be selective in their cognitive distortions, the data were analyzed to see if depressed participants were more accurate in their cognitions of negative events but negatively distorted their cognitions when experiencing more positive events. A positive event, for the purposes of this study, was operationally defined as better performance on the exam as reflected by a higher exam score, although a negative event was similarly defined as poorer performance on the exam as reflected by a lower exam score. The results clearly indicated that the prediction made by depressed and nondepressed participants were very similar whether the participants scored well or poorly on the exam. Thus, depressed participants did not make more accurate predictions than their nondepressed counterparts when negative events occurred and poor exam scores were earned. Likewise, depressed participants did not make more negative predictions than their nondepressed counterparts when positive events occurred such as scoring well on the exam.

Levels of satisfaction with exam scores.

Another level of investigation sought to learn if depressed participants evaluated their performance more negatively than nondepressed participants. Participants were asked to rate their level of satisfaction with their actual exam score on a 5-point scale (highly satisfied, moderately satisfied, satisfied, somewhat unsatisfied, highly unsatisfied). Depressed and nondepressed participants did not differ in their satisfaction ratings. Participants in both groups tended to be more satisfied with higher exam scores and less satisfied with lower exam scores.

Some implications of the findings.

The results of this study suggest that depressed and nondepressed participants do not differ significantly in the accuracy of their predictions of their exam scores, in the positive or negative direction of their predictions, or in their evaluations of their exam performances. Neither do they differ in their predictions of their scores whether their scores are high or low. The results of this study were robustly nonsignificant and support the notion that those with depressive symptoms are no different than those without depressive symptoms in their tendency to distort cognitively with regard to predictions of their performance on an examination or evaluations of their performance on the same examination. The idea that negative cognitive distortion is a fundamental factor in depression was not supported by the results of this research. Neither was the notion supported by this research that those with depression are significantly more accurate in their cognitions about their exam performance (depressive realism). The results of this study suggest that those who are depressed are no more accurate than those who are not depressed. In fact, the depressed and nondepressed participants were more alike than different in their exam score predictions and in their level of satisfaction with their exam performance. Likewise, the self-efficacy of those with more depressive symptoms, as measured by their predictions of their exam scores, was no different than the self-efficacy of those with fewer depressive symptoms.

This study supports the notion that depressed students are no more negative in their expectations, predictions, or evaluations of their exam performance than those who are not depressed. An additional finding included the fact that negative attributional style and depressed scores on the BDI-II were correlated. Since the literature suggests that those who are depressed are more negative in their thinking and in their attributional style, it is possible that the depressed are actually experiencing a more negative reality

than those who are not depressed; therefore, their negative cognitions are an accurate reflection of their more negative life circumstances. Coyne and Gotlib (1983) have criticized cognitive theorists for suggesting that depression is the result of negative cognitive distortions of reality. They maintain that depression is the result of negative and unpleasant life circumstances, not the result of cognitive distortions about life. Coyne and Gotlib argue that depression is more closely related to environmental antecedents and consequences and is not determined by cognitive distortions. They agree that depressed persons evaluate themselves and their performances more negatively but they do not believe those negative evaluations are distortions.

There are treatment implications to the finding that depressed participants do not distort their cognitions in a negative direction. Cognitive-behavioral therapists often ask depressed patients in psychotherapy to do small “experiments” to test whether their negative thoughts are accurate or not. The therapists expect that patients who collect actual “data” with regard to their negative conclusions will find that things are much more positive than they believed. This therapist expectation is based upon the assumption that patients are distorting reality in a negative direction, thus drawing conclusions based upon that negative bias. If, however, depressed patients are accurate in their thinking, empirical treatment approaches will serve only to reinforce their negative views as having been correct in the first place. If depressed patients are accurate in their negative perceptions of themselves and their relationships, treatment approaches that focus on problem solving and skill building would be more valuable than altering negative cognitions. For example, if a depressed patient believes that he is unpopular, it makes a big difference whether or not he is correct. If the patient is quite popular and simply does not realize it, the best approach would be to help the patient perceive and understand the evidence he is missing that confirms his popularity. If, however, the patient really is unpopular, he would benefit more from social skills training than from cognitive

restructuring. Social skills training would help him improve his social standing and actually become more popular.

Interesting correlations that emerged.

The results of this study revealed a significant negative correlation between scores on the BDI-II with scores on the final exam. Thus, higher levels of depressive symptoms correlated with lower exam scores, and lower levels of depressive symptoms correlated with higher exam scores. However, the negative correlation of $-.149$ explains only 2% of the variance. That is, knowing the BDI-II score allows us to predict about only 2% of the variance in the exam score. The mean exam score for depressed participants was 58%, which was below the mean for the entire sample of 65%. The mean exam score for nondepressed participants was 66%, or slightly higher than the mean for the entire group. There was a significant difference between the mean exam scores of the depressed and nondepressed participants, suggesting that depressed participants did significantly more poorly on the exam. In terms of exam grades, the average depressed student earned an "F" on the exam while the average nondepressed student earned a "D". This can be the difference between passing and failing. This finding is consistent with our knowledge of depression. We expect depression to have a negative effect on academic performance (American Psychiatric Association, 2000). A number of researchers have suggested possible explanations for the lower academic performance of depressed participants. A study by Ellis, Varner, Becker, and Ottaway (as cited in Hunt & Ellis, 1999) pointed out that being in a sad mood affects the ability of college students to activate and use prior knowledge. Likewise, Hertel and Hardin (1990) found a correlation between depression and deficits in memory while Conway and Giannopolous (1993) found an association between depression and deficits in problem solving. Clearly, depression is associated

with certain deficits in cognitive performance though negative cognitive distortions may not be among those deficits.

Some interesting results emerged which were not related to the central focus of the study. Some caution must be exercised in giving weight to these results since calculating multiple correlations can lead to some significant correlations emerging merely by chance. One surprising finding was that the amount of time spent studying for the exam and the score earned on the exam were not correlated. One would expect to find that increasing amounts of study led to increasingly better scores on the exam. This was not the case in this research project, however. In part, the explanation may relate to test anxiety. Those who scored highly on test anxiety also scored higher on study time. This suggests that increased levels of test anxiety led to increased efforts in study and preparation for the exam. Those study efforts did not, however, appear to bear fruit. Exam score and test anxiety score were negatively correlated, suggesting that increased test anxiety resulted in increased study time but in lower exam scores. Test anxiety was also negatively correlated with overall grade point average. Although test anxious participants appear to spend time studying, it does not lead to improved exam scores or higher grade point averages. The literature on test anxiety explains that test anxious participants tend to focus on distracting thoughts about their own performance fears during an examination rather than focusing on the task at hand. This self-preoccupation shifts their attention away from the material they have studied and contributes to their poorer performance on the test (King, Mietz, Tinney, & Ollendick, 1995; Sarason, 1984; Sarason, Sarason, Keefe, Hayes, & Shearin, 1986; Sarason, Sarason, & Pierce, 1990). Thus, it seems that test anxiety is a moderator variable that plays a role in the relationship between amount of study time and success on an examination. There may be other moderator variables, as well, which were not examined in this project.

Higher grade point average correlated with higher exam score prediction error for

predictions made before taking the exam, as well as for predictions made after taking the exam. Since the majority of participants tended to overestimate the exam score they would earn, the participants with the higher GPA's tended to overestimate their exam scores more than did the participants with the lower GPA's. Interestingly, Test Anxiety Scale scores tended to moderate the tendency to overestimate exam scores. Test anxiety negatively correlated with prediction error. The higher the test anxiety, the lower the prediction error for predictions made before taking the exam and after taking the exam. Test anxious participants tended to be more realistic in their exam score predictions, although both depressed and nondepressed participants tended to overestimate the score they would earn on the exam.

Exam score and overall grade point average correlated. Thus, those with higher GPA's tended to earn better exam scores than those with low GPA's. Age and overall grade point average were also positively correlated. This positive correlation suggests that older students tended to have higher GPA's. Amount of time spent studying for the final exam also positively correlated with age. Taken together, these results suggest that older students tend to spend more time studying, to earn higher exam scores, and to earn higher GPA's.

One limitation of the present study is that depression was defined by the presence or absence of depressive symptoms as reported on the BDI-II. No attempt was made to identify a body of research participants who were clinically diagnosed with a depressive mental illness. Studies utilizing college students as participants are analogue studies and may not actually represent the experiences of patients diagnosed with a depressive illness. Coyne and Gotlib (1983) have criticized the research community because they believe the majority of what is known about cognition in depression was learned from the study of mildly depressed college students. They argue that elevated depression scores on self-report questionnaires by college students represents mild and brief experiences of

depression that are not comparable to more serious episodes of depressive illness. Coyne and Gotlib point out that most depressed students who participate in studies recover from their depression within three weeks and very few seek treatment. Hammen (1980, as cited in Michael & Funabiki, 1985) found that many participants who were identified as depressed on the basis of a BDI score of 16 or greater were not actually clinically depressed. Sixty percent were not depressed when a diagnostic interview was added to the selection criteria. It is possible that the absence of negative cognitive distortions in the depressed participants in this study was the result of their depressive symptoms being mild and temporary, and that the study of clinically diagnosed depressed patients would have yielded different results. It is also possible that measuring students' levels of depressive symptoms at final exam time introduces a confound into the study. That is, students may be more depressed, more fatigued, more worried, and more sleep-deprived at final exam time than at other times during the school year. However, this condition may be quite transient; and depressive symptoms may pass away spontaneously as soon as exams are over. Future studies may wish to focus on cognitive accuracy or distortion in a clinically depressed population of participants such as people who are diagnosed with depression and who are receiving treatment for this disorder. If this study design were repeated, it might also be wise to measure depressive symptoms using the BDI-II several times prior to final exams and include in the depressed group only those students who score consistently within the depressed range over a period of time.

Construct validity is somewhat limited by the use of college and graduate students as participants in the present study. The results may not be widely generalizable beyond student populations. It is uncertain, for instance, how much the results can be generalized to those who never attended college.

Because this study utilized a correlational design, the participants were not randomly assigned to the depressed and nondepressed conditions. Differences or their

absence may not be due to the influence of depression as a variable. Instead, they may be due to some extraneous variable. For instance, a student who obtains a 71% and rates it as highly satisfactory may not have had time to study and may be pleasantly surprised with a passing grade. This variable is unrelated to the presence or absence of depression. Study time is an historical artifact that cannot be completely ruled out as a factor influencing exam score prediction or satisfaction because of the absence of random assignment to groups. A follow-up study could be designed to overcome this shortcoming by actually manipulating the depression variable. There are experimental designs in which participants are randomly assigned to the depressed and nondepressed groups. A mild temporary depression is then created in the participants assigned to the depression group by having them read lists of negative and unpleasant adjectives. Such an experiment would be an alternative to the design presented here and may be an appropriate follow-up to the present study.

It is also possible that depressed people tend to engage in hyperbole when describing their negative thoughts; this hyperbole is not reflected in their actual written estimates and predictions. Possibly, depressed people describe things in conversation that suggest exaggerated negative distortions of thought; but they dispense with those negative exaggerations when asked to commit predictions, estimates, or evaluations to paper.

In conclusion, the variable of depression score on the BDI-II did not significantly affect the cognitive accuracy of exam score predictions, nor the satisfaction level with earned exam scores for the students in this study. Neither the notion of negative cognitive distortions among the depressed nor the notion of depressive realism was supported by this research. A possible explanation of why negative distortions did not appear among those with depressive symptoms may be the behavioral notion that those who are depressed are more negative in their thinking because their actual life experiences are

more negative. Thus, negative thinking among those who are depressed may actually be accurate thinking by people in negative circumstances. It is also possible that analogue research using college students as research participants, and using BDI-II scores to measure depression does not accurately reflect the cognitive accuracy of patients who are actually diagnosed with depressive disorders. Nevertheless, this study does not support the notion that increased depressive symptoms coincide with increased negative distortion in cognition. The predictions and evaluations, in this study, of those with higher depressive symptoms were no different than those with lower depressive symptoms.

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Appendix A

Explanation Read to Participants at the Start of the Study

You are being invited to participate in a doctoral dissertation research project. The purpose of the study is to better understand some of the things that effect a student's ability to guess the score he or she will earn on a course examination. We will also be studying how satisfied students are with the scores they earn on an exam. The things being studied include depression, anxiety, age, marital status, test anxiety, amount of time spent studying for the exam, and general level of psychological distress.

You are being asked to be in this research study because your professor has agreed to allow this class to be part of the project. We hope you volunteer to be involved in the study. However, you are completely free to decide not to be involved. If you do not wish to take part, it will not affect your grade or affect you negatively in any way. If you decide to be involved, you may change your mind and drop out of the study at any time without any negative consequences to you.

If you decide to take part, it will involve approximately one hour of your class time and about 18 minutes of your time just before and just after taking the final exam. If you take part, you will be asked to complete 5 psychological questionnaires in class and to provide some information about yourself such as your address, age, marital status, race, and overall grade point average. Just before you take the exam for this course, you will be asked to write down the score you think you will earn on the exam and how much time you spent studying for the exam. When you complete the exam, you will be asked to guess what score you earned on the exam. When your exam has been scored, you will be informed of your score and asked your level of satisfaction with the score you received. Neither your course instructor nor anyone at the University will know what score you

predicted you would receive nor how satisfied you are with the score you receive. The investigator will know this information as well as your exam score. All information will be kept confidential.

If you do not wish to participate, you may leave class now. For those of you who are staying, I would now like to read the informed consent form to you and have you sign it to acknowledge your voluntary participation in this study.

Appendix B

INFORMED CONSENT FORM

TITLE OF STUDY

Realism or Distortion in Predicting and Evaluating Exam Performance Among College Students

PURPOSE

The purpose of this study is to better understand some of the things that affect a student's ability to guess the score he or she will earn on a course examination. We will also be studying how satisfied students are with the scores they earn on an exam. The things being studied include depression, anxiety, age, marital status, test anxiety, amount of time spent studying for the exam, and general level of psychological distress.

You are being asked to be in this research study because your professor has agreed to allow this class to be part of the project. We hope you volunteer to be involved in the study. However, you are completely free to decide not to be involved. If you do not wish to take part, it will not affect your grade or affect you negatively in any way. If you decide to be involved, you may change your mind and drop out of the study at any time without any negative consequences to you.

INVESTIGATOR(S)

Name: Michael J. Kinney, M.A. (responsible investigator)

Department: Psychology (doctoral candidate)
Philadelphia College of Osteopathic Medicine

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Mechanicsburg, PA 17050

Phone: (717) 697-2244

Name: Elizabeth A. Gosch, Ph.D. (principle investigator)

Department: Psychology

Address: Philadelphia College of Osteopathic Medicine
4190 City Avenue
Philadelphia, PA 19131-1693

Phone: (215) 871-6509

Name: David C. Hill, Ph.D. (co-investigator)

Department: Psychology

Address: Millersville University
Byerly Hall, Room 208
Millersville, PA

Phone: (717) 872-3089

Name: David Rafael Castro-Blanco, Ph.D. ABPP, FAClinP (co-investigator)

Department: Psychology

Address: Philadelphia College of Osteopathic Medicine
4190 City Avenue
Philadelphia, PA 19131-1693

The doctors and scientists at Philadelphia College of Osteopathic Medicine (PCOM) do research on diseases and new treatments. The study you are being asked to volunteer for is part of a research project.

If you have any questions about this research, you can call Dr. Elizabeth A. Gosch at (215) 871-6509.

If you have any questions or problems during the study, you can ask Dr. Gosch, who will be available during the entire study. If you want to know more about Dr. Gosch's background, or the rights of research subjects, you can call Dr. John Simelaro, Chairperson, PCOM Institutional review Board at (215) 871-6337.

DESCRIPTION OF THE PROCEDURES

You will be asked to complete 5 psychological questionnaires including:

Beck Depression Inventory-II

Beck Anxiety Inventory

Brief Symptom Inventory

Attributional Style Questionnaire

Test Anxiety Scale

These 5 Questionnaires include a total of 180 questions and require from 33 to 55 minutes to complete. You will be asked to complete a form listing some information about yourself such as your name, address, gender, age, race, marital status, current year in school, academic major, and current overall grade point average. In addition, you will be asked, just before and just after you take the course examination, to predict the exam score you believe you will earn. You will also be asked to write down the amount of time

you spent studying for the examination. When you learn your actual exam score, you will be asked to write down how satisfied you are with your score. The investigator will also know your exam score.

POTENTIAL BENEFITS

You may feel some satisfaction because you have personally taken part in a scientific project from which new knowledge may come. You will also have the opportunity to participate in doctoral research as part of your academic experience. In addition, you will learn about 5 of the most often used psychological self-report questionnaires by actually completing them yourself.

You may not benefit directly from being in this study. However, other people may benefit in the future from what the researchers learn.

RISKS AND DISCOMFORTS

There are no significant risks to subjects who take part in this study. Those who volunteer will give approximately one hour of their time to complete forms and psychological self-report questionnaires. Completing the questionnaires about personal thoughts and feelings may cause some emotional discomfort or seem an intrusion upon your privacy. However, these questionnaires are the most widely used instruments of their type and have been used many times with no ill effects to either mentally healthy or mentally ill subjects. If you feel distressed or upset by mental or emotional problems, we encourage you to contact the Millersville University Department of Counseling and Human Development for assistance. The Department of Counseling and Human Development

can be found in Lyle Hall on the Millersville campus or reached by calling 872-3122. If you report serious or dangerous mental health problems on the self-report questionnaires, the investigators will contact you by mail to remind you of your opportunity to seek counseling.

There are no known risk or discomforts that will result from being in this study.

ALTERNATIVES

Being involved in this study is completely voluntary, and there will not be any negative consequences if you choose not to participate. If you choose to take part and then change your mind at any time, you are free to withdraw.

PAYMENT

You will not receive any payment for being in this study.

CONFIDENTIALITY

All information and records relating to your involvement will be kept in a locked file. Only the investigators, the U.S. Food and Drug Administration, and members of the Institutional Review Boards (IRB) of the Philadelphia College of Osteopathic Medicine and Millersville University will be able to look at these records. If the results of this study are published, no names or other identifying information will be used. Your responses on the self-report questionnaires will not be shared with anyone other than the investigators and the IRB board members. If an investigator is also an instructor, he or she will not

have access to your scores on the psychological questionnaires. Your prediction of your exam score and your satisfaction with your exam score will not be shared with the course instructor or anyone at the University.

REASONS YOU MAY BE TAKEN OUT OF THE STUDY WITHOUT YOUR CONSENT

If your responses on the self-report questionnaires are incomplete, your data may not be usable.

NEW FINDINGS

If any new information develops that may affect your willingness to stay in this study, you will be told about it.

INJURY

If you are injured as a result of this research study, you will be provided with immediate necessary medical care.

However, you will not be reimbursed for medical care or receive other payment. PCOM will not be responsible for any of your bills, including any routine medical care under this program or reimbursement for any side effects that may occur as a result of this program.

If you believe that you have suffered injury or illness in the course of this research, you should notify John Simelaro, D.O., Chairperson, PCOM Institutional Review Board at

(215) 871-6337. A review by a committee will be arranged to determine if your injury or illness is a result of your being in this research. You should also contact Dr. Simelaro if you think that you have not been told enough about the risks, benefits, or other options, or that you are being pressured to stay in this study against your wishes.

VOLUNTARY PARTICIPATION

You may refuse to be in this study. You voluntarily consent to be in this study with the understanding of the known possible effects or hazards that might occur while you are in this study. Not all the possible effects of the study are known.

You may leave this study at any time.

You also understand that if you drop out of this study, there will be no penalty or loss of benefits to which you are entitled.

I have had adequate time to read this form and I understand its contents. I have been given a copy for my personal records.

I agree to be in this research study.

Signature of Subject: _____

Date: ___ / ___ / ___ Time: _____ AM/PM

Signature of Witness: _____

Date: ___ / ___ / ___ Time: _____ AM/PM

Signature of Investigator: _____

Date: ___ / ___ / ___ Time: _____ AM/PM

Appendix C

Subject Information Form

Please answer the following questions about yourself. Information about your individual answers will not be shared with your professor or any member of the faculty or administration of the university.

1. Name: _____

2. Address: _____

3. Age: _____

4. Gender:

male _____ female _____

5. Race:

Caucasian _____

African-American _____

Hispanic _____

Asian _____

Native American _____

Pacific Islander _____

Other _____

6. Marital status:

married _____

never-married _____

divorced _____

widowed _____

7. Year in school:

1st year college _____

2nd year college _____

3rd year college _____

4th year college _____

5th year college _____

1st year graduate _____

2nd year graduate _____

3rd year graduate _____

8. Academic major: _____

9. Current overall grade-point average: _____

Appendix D

Example of the Letter Sent to Students Who Reported Dangerous Symptoms on the Psychological Questionnaires.

(date)

(address)

Dear (student's name)

Thank you for participating in the dissertation research project being conducted in the psychology classes at Millersville University. Your answers on the psychological instruments administered as part of that research project suggested the area or areas of concern that are designated below:

- _____ Thoughts of harming yourself
- _____ The urge to harm someone else
- _____ Depressive symptoms in the severe range

Please remember that if you should desire professional assistance to help you deal with the concern or concerns listed above, the Millersville University Department of Counseling and Human Development is available to you. Services can be obtained by contacting them at: Millersville University Department of Counseling and Human Development

Lyle Hall

Millersville University

Phone: 872-3122

If you have any questions about your results, please feel free to contact me at 717- 697-2244. Thanks again for your participation.

Sincerely,

Michael J. Kinney

Doctoral candidate and responsible investigator