DEFENSIVE BIAS AND COLLEGE STUDENT

DRINKING: DO SELF-AFFIRMATIONS

INCREASE ACCEPTANCE TO

THREATENING INFORMATION?

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CHAPTER I

I. INTRODUCTION

Background

College student drinking is a serious problem. Each year college student drinking is responsible for approximately 1,400 college student fatalities, 500,000 injuries, 400,000 cases of unprotected sex, 632,000 assaults, and 71,000 cases of sexual assault (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002). In addition, Hingson et al. (2002) reported an estimated 3.1 million students (approximately 39 percent) reported riding with a drinking driver and 2.2 million (approximately 28 percent) reported driving drunk in the month prior to the survey.

A particular pattern of alcohol use called binge drinking, defined as five or more drinks in a single session (or, 4 or more drinks for women), has been a focus of research on college-age alcohol use. Wechsler, Lee, Kuo, and Lee (2000) found that frequent binge drinkers are more likely to experience alcohol related problems than other drinkers. They also found that college students reported engaging in frequent binge drinking, defined as at least one binge in the past 2 weeks, more than same-age non-college peers (40% versus 35%, respectively). Hingson et al. (2002) found similar results in that 42 percent, over 3.3 million, of college students engaged in binge drinking a least once in the past 30 days.

As a response to the aforementioned problems, a number of colleges and universities have implemented drinking-related programs. Unfortunately, these programs appear largely ineffective (Walters, Bennet, & Noto, 2000). Most programs are not empirically validated and those that are often change knowledge and attitudes about alcohol but not alcohol-related behavior (cf. Hingson et al., 2002). Some programs rely solely on information regarding the dangers of alcohol use, a clearly ineffectual method to change alcohol related behavior (Moskowitz, 1989; cf. Walters et al., 2000). Moskowitz (1989) provides an excellent review of primary prevention programs. Although slightly outdated, many colleges and universities still implement the programs reviewed. While some evaluations of college based prevention programs have reported promising results, serious methodological flaws cast doubt to the accuracy of these findings.

The Problem

One possible reason for the ineffectiveness of prevention programs is that individuals often respond to threatening health information in a defensive manner. For example, when presented with threatening health information, individuals often engage in a variety of defensive behaviors including discounting the seriousness of the threat (Jemmott, Ditto, & Croyle, 1986), challenging the accuracy of the threatening information (Ditto, Jemmott, & Darley, 1988; Kunda, 1987), and generating alternative explanations to discredit the information (Ditto & Lopez, 1992).

Self-affirmation theory (Steele, 1988) refers to these reactions as defensive bias and states that the key to reducing this bias is through self-affirmation. According to this theory, defensive bias is essentially an effort to protect self-image. Self-affirmations

minimize the need for self-image protection by affirming the self in another important domain. To date, no studies have tested self-affirmation theory in a college student binge drinking population. Leffingwell, Neumann, Babitzke, and Bozcar (2003) have demonstrated that within this population, defensive bias to threatening health information concerning college binge drinking clearly exists among alcohol-using college students. What is unclear, however, is whether or not a self-affirmation task will reduce defensive bias within this population.

The Purpose

The purpose of this study was to determine if a self-affirmation task would reduce defensive bias in a college student binge drinking population. Specifically, this study examined the effect an affirmation task would have on changing drinking-related attitudes and behavior. This study also examined the relationship between self-affirmations and self-esteem (a construct thought to play an important role in self-affirmations). Since prevention and treatment programs, at least to some extent, rely on threatening health messages to facilitate behavior change, and individuals tend to display a defensive bias to such information, reducing defensively biased processing of the information may be particularly important in enhancing the efficacy of these programs.

CHAPTER II

II. LITERATURE REVIEW

Overview

      Self-serving biases exist in a number of domains. To name a few, individuals are more likely to accept positive evaluations than negative evaluations (Pyszczynski & Greenberg, 1987), recall positive personality information easily and negative personality information poorly (cf. Taylor & Brown, 1988), and when negative aspects of the self are acknowledged, they tend to be minimized (see Brown & Dutton, 1995; Taylor and Brown, 1988). This review will focus primarily on health related attitudes and behaviors. First, a review of observational studies examining defensive bias will be presented. The review will highlight the magnitude of the problem of defensive bias as well as the strengths and limitations of the studies. Next, a review of experimental studies will show that defensive bias exists even in a highly controlled laboratory environment. Lastly, a review of the theories of motivation for defensive bias with particular emphasis on self-affirmation theory will be presented.

Defensive Bias (Observational Studies)

      When asked about susceptibility to health related problems, individuals tend to believe they are less at risk than others (cf. Weinstein, 1982). Weinstein (1982) attempted to gain a better understanding of why this occurs. Using a college-aged sample, he found that when compared to their peers, individuals reported being at a

below average risk on 35 out of 45 health problems. Two variables were highly

correlated to this self-serving bias: controllability and problem experience. In other

words, unrealistic optimism existed when problems were perceived to be controllable by

personal actions and when individuals believed that the risk for experiencing health

problems is low if no problems have occurred yet. Additional research (cf. Weinstein,

1984) has found that when individuals do experience undesirable outcomes, they blame

external factors.

Weinstein (1984) extended this research by examining the reasons people give for

being less at risk than others. Undergraduates were presented with a number of health

problems and asked to compare their risk with that of their peers. Their explanations

could fall into five different categories: actions and behavior patterns, heredity,

physiology or physical attributes, environmental, and psychological. The results of four

studies found that actions and behavior patterns were consistently associated with self-

serving biases. For example, individuals reported being less at risk for developing

alcoholism than their peers. When asked to explain why, they tended to view their

drinking behavior as moderate and limited compared to peers. In other words, students

tend to believe their actions are less risky than their peers.

One limitation to the previous studies is that results from a college population

may not generalize to the rest of the adult population. College students may not represent

the rest of the population since they are likely to be in better health, become better

educated, and come from wealthier homes than the average person (Weinstein, 1987).

However, Weinstein (1987) suggests this is not the case. Using a diverse adult

population, (i.e., adults ages 18-65 from upper-middle income families to lower-income

families) participants were asked about the risks of developing a variety of health related problems. Consistent with past research, self-serving biases were found in this sample. Furthermore, these biases were unrelated to age, sex, level of education, or occupational prestige. Also, consistent with Weinstein (1982), the belief that "if problems have not occurred yet, they won't occur in the future" was highly correlated to reporting a below average risk.

Studies examining smoking, drinking and sexual behavior have found similar results. Although smokers recognize the health risks of smoking, they view it as less of a risk compared to non-smokers (Lee, 1989). Furthermore, while smokers rate their own risk for smoking related illnesses as higher than non-smokers, they also rated their risk as lower than the average smoker (McKenna, Warburton, & Winwood, 1993). Other studies have found that smokers who relapse change their perceptions about the health risks of smoking (i.e., view smoking as less hazardous to health than before attempting to quit; Gibbons, Eggleston, & Benthin, 1997*).*

Alcohol-using college students also show defensive bias for alcohol use. Leffingwell et al. (2003) found that alcohol-using college students were more likely to rate college drinking as a less important problem than non-using students. In addition, alcohol-using students questioned the science behind college alcohol studies to a greater extent than non-using students.

Burger and Burns (1988) examined self-serving biases in sexually active female college students. They found that participants rated themselves as much less likely to become pregnant than other university females, as well as the average American female their age and the average American female of childbearing age. Furthermore, the greater

the perceived difference, the less likely participants were using effective methods of birth control.

Whitley and Hern, (1991) also found that female college students rated themselves as much less likely to become pregnant than other females. However, participants had accurate perceptions of their risk and overestimated the risk of others. In contrast to Burger and Burns (1988), those using poor birth control measures had increased risk perceptions relative to those using more effective contraception.

Not only do individuals engage in self-serving biases, these biases appear highly resistant to change. Weinstein and Klein (1995) conducted four studies that attempted to reduce these biases in a number of different ways. Study 1 provided participants with a list of risk factors for several health problems. Study 2 presented information about reducing the risk of developing certain health problems (e.g., excessive weight gain or developing a drinking problem). Presumably most participants would see their behavior as less than ideal. Study 3 asked participants to picture either a high-risk or low-risk target with the expectation that they would not fit the profile of a low-risk target and see their risk as higher. Study 4 asked participants to list risk factors that may contribute to a weight or drinking problem. They hypothesized that the more risks they recognized, the more at risk they would see themselves. None of the studies found a reduction in perceived risk suggesting that self-serving biases are not easily changed via rational persuasion.

In sum, when individuals are asked about their susceptibility to a variety of health related problems, they tend to believe they are less at risk than their peers. These self-serving biases do not appear to be related to age, gender, or social status. They are also

highly resistant to change. Furthermore, individuals do not acknowledge that actions or behaviors may place them at greater risk for health related problems and when individuals engage in risky behavior (i.e., begin smoking again) risk perceptions often change (i.e., see smoking as less of a health hazard than when they were quit).

One limitation to the previous studies is that they rely on observational designs and do not test cause-and-effect relationships. Without control groups, it is difficult to separate out confounding variables. Fortunately a number of studies have utilized experimental research designs. These studies provide additional evidence for defensive bias and have found that multiple variables are related to these biases.

Defensive Bias (Experimental Studies)

Ditto, Croyle and colleagues conducted a series of experiments to better understand how individuals respond to threatening health information (reviewed in Ditto & Croyle, 1995). These studies brought college student participants into a laboratory setting and told them they either had or did not have a fictitious enzyme disorder. Participants were told that the disorder was real, that lacking a specific enzyme was a risk factor for a number of pancreatic disorders, and that a simple test could determine whether or not they had the enzyme deficiency. They were then tested and provided with bogus diagnostic feedback.

In the first of a series of studies, Jemmot et al. (1986) found that participants who were told they tested positive for the deficiency (i.e., lacked the enzyme) believed the disorder was less serious and the test was less accurate than those who tested negative. Perceived prevalence also had an impact on perceived seriousness of the disorder in that participants who were told it was more prevalent believed the disorder to be less serious

than participants who were told it was a rare condition. Several experiments following Jemmot et al. (1986) attempted to determine if the results were due to defensive motivational processing.

One explanation to the findings in Jemmot et al. (1986) is that because participants were not experiencing any symptoms of the disorder, they may have minimized the seriousness of the disorder. Croyle and Sande (1988) suggest this is not the case. In addition to replicating the findings of Jemmot et al. (1986), participants were given a list of symptoms that were supposedly associated with the disorder and asked them to complete a symptom checklist after receiving their diagnosis. Participants in the enzyme deficiency group recalled more symptoms consistent with their diagnosis than non-enzyme deficient participants suggesting that threat minimization is not due to symptom unawareness.

Next, Ditto et al. (1988) examined the relationship of threat appraisal and treatment availability. The enzyme deficiency paradigm was again used in this study except that half of the participants were led to believe it was a treatable disorder and half were not. This was done with the idea that participants who believed a treatment was available would be less motivated to deny the seriousness of the disorder. Consistent with their expectations, Ditto et al. (1988) found that treatment-informed deficiency participants and no-deficiency patients rated the disorder as more serious than deficiency patients who believed no treatment existed. In addition, treatment-uninformed participants rated pancreatic disorders as less serious and the rate of false-positives for the diagnostic test as higher than the other groups.

The last explanation explored involved examining the role of expectations about health threat. Since most college students don't expect to be sick (i.e., have an enzyme deficiency), they may discount the accuracy of a test that reports having a rare condition. Ditto and Lopez (1992, study 3) addressed this issue. In this study, all participants were led to believe they had the deficiency. However, participants were either told it was either positively or negatively related to pancreatic disease. Participants were also assigned to respond to diagnostic information either before or after receiving diagnostic feedback. Results demonstrated that participants in the after-diagnosis unhealthy medical condition offered more alternative explanations for why they tested positive and rated the diagnosis as less accurate than participants in both the healthy diagnosis condition and before test unhealthy medical condition. Furthermore, participants did not differ in pre-diagnostic expectations of having the enzyme deficiency regardless of being told it was a positive or negative condition. In other words, pre-diagnostic expectations for an enzyme disorder were not responsible for group differences in perceived accuracy or offering alternative explanations for testing positive.

Ditto, Croyle, and colleagues state that their findings may be due to "motivated skepticism". They believe that preferred information (i.e., information that has desirable consequences) is processed relatively quickly while non-preferred information (i.e., threatening information) involves in-depth cognitive analysis. Therefore, more information is needed for individuals to accept threatening information. Ditto and Lopez (1992, study 2) provide support for this hypothesis. This study replicated the results of previous studies (i.e., participants discounted the seriousness and accuracy of threatening health information). In addition, participants in the deficiency condition spent more time

deciding their test result was complete and were more likely to re-test themselves for the deficiency.

Other research has confirmed and has extended these results. Kunda (1987, study 3) attempted to better understand the process of self-serving evaluations of threatening information. Heavy and low caffeine drinkers were provided information linking caffeine to fibrocystic disease, a disease associated with breast cancer. While previous literature suggested a link between the two, current research has cast the relationship in serious doubt. Furthermore, most individuals are unfamiliar with this supposed link. Results indicated that although heavy caffeine drinkers perceived a greater risk for developing the disease, they believed less in the evidence than low caffeine drinkers and men. Kunda (1987, study 4) was identical to study 3 except that participants were told the disease was present in 65% of women. Consistent with Jemmott et al. (1986), perceived prevalence influenced defensive bias. Women who were heavy caffeine consumers did not display defensive bias (they were just as convinced by the evidence as low caffeine consumers and men). This suggests that perceived prevalence is an important factor in determining the threat of risky health behaviors. These studies provide evidence for the motivational nature of self-serving biases.

Another factor examined is the relationship between degree of threat and defensive bias. Past research has found that high fear messages versus low fear messages often results in defensive processing of threatening health information (cf. Liberman & Chaiken, 1992). Liberman and Chaiken (1992) were interested in the difference between high and low threat messages and extended Kunda's (1987, study 3) findings using the same experimental methods except a low threat group was added (i.e., participants were

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told that evidence refuting the link has also been found). Heavy caffeine consuming women were less likely to believe in a link between caffeine use and breast cancer and found more weaknesses in the high threat message than low caffeine consumers. In addition high relevance subjects reported more fear than low relevance subjects, lending support that self-serving bias is motivated by personally relevant threatening information. No differences in effort devoted to reading and processing the information were found.

One limitation to the previously discussed experimental research is that it involves fictitious disorders that are unfamiliar to participants. It is possible that individuals may respond differently to more familiar health risk information. Several studies involving familiar health risks demonstrate this does not appear to be the case. For example, Croyle, Sun, and Louie (1993) provided a cholesterol screening test and randomly assigned participants to receive either positive (low cholesterol) or negative (high cholesterol) feedback. Those who received negative feedback rated high cholesterol as less threatening to health, believed it to be more prevalent in the population and viewed the cholesterol test as less accurate than participants given low cholesterol feedback. Similar results were found when participants were randomly assigned to receive high or normal blood pressure feedback (Croyle, 1990).

Another study examined perceptions of gum disease. McCaul, Thiesse-Duffy, and Wilson (1992) led participants to believe they had, did not have, or were at risk for gum disease. Participants who were told they were at risk or had gum disease believed it was less serious and much more prevalent than those told they did not have gum disease. A two-day follow-up found that these biases did not change, suggesting that these beliefs are stable over time.

One factor that appears to contribute to self-serving biases is social comparison. Klein and Weinstein (1997) contend that individuals often engage in downward comparison (i.e., comparing themselves to individuals worse off than themselves) when presented with threatening information. For example, Hakmiller (cf. Klein & Weinstein, 1997) found that when participants were told they were hostile toward their parents, they preferred to be compared with individuals perceived as more hostile than themselves.

When individuals can't engage in downward comparison, heath risk information is downplayed. Klien (1996, study 2) told participants that their peers engaged in risky behaviors related to heart disease and alcoholism at an unrealistically low rate making it highly likely that participants engaged in risky behaviors to a greater degree than their peers. Since the participants comparison group engaged in less risky behaviors, participants would have a more difficult time engaging in downward comparison. Participants were then asked to report their own behaviors either before or after rating the health relevance and personal importance of these behaviors. Participants rated the health relevance and personal importance of these behaviors significantly lower when reporting their own behaviors first. In other words, when participants compared their higher risk behaviors to those of their peers before rating health relevance and personal importance, they downplayed the seriousness of their risky behaviors.

Social influence is another important factor. Using the same fictitious enzyme paradigm previously discussed, Croyle and Hunt (1991) examined the impact social situations may have on self-serving biases. All participants were told they tested positive for an enzyme deficiency. In addition, a confederate posing as a research participant received either positive or negative feedback. Furthermore, half the time the confederate

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said nothing while half the time he expressed a minimizing appraisal (i.e., "It doesn't seem like a big deal to me") before the results were given. Results indicated that the minimizing appraisal from the confederate lowered concern about the disorder and increased short-term avoidance. In addition, participants viewed the disorder as much more prevalent when the confederate also tested positive which decreased behavioral action plans.

In sum, experimental research provides clear support that individuals engage is self-serving biases when presented with threatening health information. When individuals are confronted with such information, they downplay the seriousness of the health risk, question the accuracy of the diagnostic test, and question the accuracy of the information provided. These reactions are not due to expectations of healthiness or lack of physical symptoms. Evidence suggests that social influences, comparing oneself to "high-risk" individuals, and differences in perceived prevalence and the cognitive processing of preferred and non-preferred information influence defensive bias.

Theories of Motivation

One explanation for the motivation to engage in defensive bias is arousal reduction. When presented with threatening information, negative physiological arousal may occur, and individuals may engage in behaviors to reduce arousal (Croyle, 1992). Brown and Rodgers (1991) found support for this hypothesis. High arousal, measured by skin conductance, after providing false failure information on a cognitive task was associated with self-serving attributions. In other words, relative to low arousal participants, high arousal participants attributed failure to more external reasons (i.e., properties of the task) than internal (i.e., low ability).

Other theories have stressed the importance of cognitive factors. Cognitive dissonance (Festinger, 1957) is one of the earliest theories. This theory proposes that dissonance occurs when a person holds two inconsistent cognitions (i.e., I like smoking but I'm concerned about its negative effects on my health). Individuals will attempt to reduce dissonance by changes in behavior and/or changes in cognitions. In the case of smoking, one can reduce dissonance by either quitting or changing his or her attitudes about the importance of quitting.

Aronson (cf. Aronson, 1999) revised the theory and argued that dissonance is a result of threatening one's self-concept. According to Aronson, individuals attempt to maintain a positive and consistent view of him/herself. A number of studies (cf. Aronson, 1999) asked participants to engage in pro-social behavior (i.e., support condom use to prevent HIV infection, engage in recycling, conserve water) followed by either asking or not asking about their inconsistencies in engaging in those behaviors. In addition most participants were not engaging in the behaviors they were supporting, creating an inconsistency in their behavior. This inconsistency was made salient for participants who reported their own behaviors and they were more likely to make consistent behavioral changes than participants who did not.

According to self-affirmation theory (Aronson, Cohen, & Nail, 1999; Sherman & Cohen, 2002; Steele, 1988), the key to dissonance reduction is addressing global self-worth rather than cognitive consistency or an individual's self-concept. Steele and colleagues contend that individuals actively attempt to maintain a sense of global self-worth. When self-worth is threatened, defensive bias occurs to reduce dissonance and restore self-worth. Because one attempts to maintain global self-worth, affirming another

aspect of one's self-worth, decreases the need to restore self-worth through defensive bias. A number of studies have examined this hypothesis. This review will consist of primarily health-related studies. Non-health related self-affirmation studies that have addressed important factors concerning self-affirmation theory (i.e., type of self-affirmation task and self-esteem), will also be discussed. For a more comprehensive review on self-affirmation see Aronson et al. (1999), Sherman and Cohen (2002), and Steele (1988).

Sherman, Nelson, and Steele (2000 study 1) examined the effect a self-affirmation task would have on health related behavior change. Using a research paradigm similar to Kunda (1987, study 3), information linking caffeine to breast cancer was presented to both frequent coffee and non-coffee drinkers. Participants were randomly assigned to a self-affirmation and no self-affirmation condition. Affirmed participants wrote a brief essay about an important personal value while non-affirmed participants did not. Results demonstrated that self-affirmed coffee drinkers were more accepting of the threatening information than non-affirmed coffee drinkers as well as self-affirmed non-coffee drinkers. In addition, affirmed coffee drinkers reported greater intentions to reduce their caffeine consumption. In other words, when coffee drinkers wrote about an important personal value and were then presented with threatening information about caffeine use, they were more accepting of the information than coffee drinkers who did not write about an important personal value.

Sherman, Nelson, and Steele (2000, Study 2) examined the impact of a self-affirmation task on AIDS education and prevention, expanding self-affirmation research to an actual health risk. As in Sherman et al. (2000, Study 1), the affirmation group

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wrote about an important personal value while the non-affirmation group did not. Sexually active undergraduates were randomized into either a self-affirmation or no self-affirmation group and then were presented with threatening information about AIDS via watching a videotape about women who have AIDS. The self-affirmation task increased acceptance of the risk of contracting sexually transmitted HIV for women only. However, after controlling for pre-experiment risk perceptions, those in the affirmation condition reported greater risk for contracting HIV. Furthermore, affirmed participants were more likely to purchase condoms and take AIDS educational brochures provided at the end of the study. In other words, writing about an important personal value increased acceptance of threatening information about contracting HIV and resulted in purchasing more condoms and AIDS information seeking. This is important because it suggests that a self-affirmation task may influence behavior. However, because actual use of condoms was not examined, strong conclusions concerning behavior change cannot be drawn.

Using the same paradigm as Liberman and Chaiken (1992), Reed and Aspinwall (1998) examined the effect a self-affirmation task would have on orientation to potentially threatening health information. All participants were given risk-confirming and risk-disconfirming information that caffeine was a risk factor for fibrocystic breast disease (FBD). However, half of the participants completed a self-affirmation task while half did not. The affirmation task asked participants questions about times when they exhibited kind and compassionate behavior. Those in the affirmation condition believed more in the link between caffeine use and FBD and oriented themselves quicker to risk-confirming information than non-affirmation participants. Interestingly, affirmation participants reported fewer intentions to make behavioral changes. Although not

significant, both groups reduced their caffeine use at 1-week follow-up with affirmation participants reporting a greater reduction.

Factors that Influence Self-Affirmation Theory

One important factor concerning self-affirmation and dissonance reduction is the type of affirmation used. Aronson, Blanton, and Cooper (1995) examined the role that specific types of affirmation have on dissonance reduction in two studies. Study one induced dissonance by asking participants to engage in an uncompassionate task (i.e., oppose an increase in spending for handicap services at a university). Participants were given either a high or low degree of choice in engaging in the uncompassionate task. Consistent with self-affirmation theory, participants given a high degree of choice agreed with the increase in spending less than the low choice and control groups. Furthermore, when given the choice to view positive personality feedback, high choice participants chose to view more positive feedback about objectivity and open-mindedness and less positive feedback about compassion than the other groups. One explanation is that those who completed a dissonant act (engaging in an uncompassionate task under high choice) reduced their dissonance by choosing to receive feedback about objectivity and open-mindedness.

Aronson et al. (1995, study 2) used the same research paradigm and again found less support for an increase in spending among high choice participants. In addition, non-affirmed participants rated compassion as a less important and objectivity as a more important personal attribute than low choice and control groups. However, both studies did not find that self-affirmation led to decreased attitude change. Aronson et al. (1995) concluded that affirmations related to the threat did not reduce discomfort because they

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made salient the contradiction between the positive affirmation (i.e., being compassionate) and the dissonant act (engaging in an uncompassionate act). It appears that in order for self-affirmations to reduce defensiveness, they must be unrelated to the threat.

Blanton, Cooper, Skurnik, and Aronson (cf. Aronson et al., 1999) also found that self-affirmations relevant to the dissonant arousing task (i.e., affirming one's sense of honesty after engaging in a dishonest task) may exacerbate dissonance reduction rather than reduce it. Aronson et al. (1995) suggest that relevant self-affirmations are threatening because they remind the individual of the failure to live up to a valued standard.

Several other factors appear to influence defensive bias including physiological arousal and self-esteem. Self-affirmation theory asserts that defensive bias occurs regardless of attribution of arousal. Steele, Spencer, and Lynch (1993, study 3) addresses the impact of mood on self-serving biases. Participants were presented with either positive mood inducing stimuli (i.e., reading an essay on a reunion of long-separated couples) or negative mood-inducing stimuli (i.e., reading an essay entitled "Babies Born with AIDS"). Both groups demonstrated self-serving biases to threatening information suggesting that self-serving biases exist even when negative arousal can be attributed to an alternative source.

Past research has found opposing results. Cooper and Fazio (1984) found that self-serving biases are reduced when negative arousal from a dissonant act can be attributed to an alternative source. Fried and Aronson (1995) also addressed the importance of attributing physiological arousal to dissonance arousing behavior.

Participants engaged in a dissonance-arousing task (e.g., campaigned for recycling and then asked about their inconsistent recycling behavior) and were allowed to either attribute the arousal to the task or other factors (i.e., lighting, temperature, and noise level). Those who attributed the arousal to the task where more likely to engage in dissonance reducing behavior (i.e., volunteering to help recycle) than those who attributed to other arousal factors.

Self-Esteem and Self-Affirmation Theory

Self-esteem also appears to influence defensive bias. According to self-affirmation theory, Steele et al. (1993) propose that high self-esteem provides a buffer against threatening information. Individuals with high self-esteem should have greater resources to cope with threatening information (i.e., high self-esteem individuals affirm themselves by recognizing other positive characteristics they possess). This differs from Aronson's (cf. Aronson, 1999) consistency model which stresses evaluative consistency. Aronson's model would expect the opposite; individuals with high self-esteem would possess more self-serving biases because engaging in risky or unhealthy behavior is inconsistent with their global self-concept.

Steele et al. (1993, Study 1 and 2) examined the role of self-esteem in self-serving biases. Results indicated that when participants were not reminded of their resources, self-esteem did not influence self-serving biases or the effect of an affirmation task. All non-affirmed participants exhibited self-serving biases to threatening information and affirmed participants did not. However, when self-esteem was made salient via completing a self-esteem measure, high self-esteem participants were more likely to

accept threatening information than low self-esteem participants. It appears self-esteem reduces defensive bias when individuals are reminded of their resources.

Chung and Sherman (2003) also examined the relationship between self-esteem and self-affirmation related to threatening health information. Participants (both high and low caffeine users) were provided with information linking caffeine use to breast cancer. Using the same research paradigm as Kunda (1987), results indicated that self-esteem moderates the effect of self-affirmation on the acceptance of threatening health information. Participants with high self-esteem accepted the threatening information regardless of caffeine condition while those with low self-esteem accepted the information only after being self-affirmed.

Opposite effects on the role of self-esteem and defensive bias have also been observed. Gibbons et al. (1997) found that self-esteem moderated perceived health risk in smokers who relapsed. Those with high self-esteem decreased their risk perceptions while those with low self-esteem did not. These findings are inconsistent with Steele's theory (1988) that people with high self-esteem are less likely to make attempts at reducing cognitive dissonance.

Limitations of Self-Affirmation Theory

A major weakness of previous self-affirmation studies is lack of behavioral measurement. In fact, out of the studies reviewed, only Reed and Aspinwall (1998) and Sherman et al. (2000, study 2) examined the relationship between a self-affirmation task and behavior change. While the results suggest that a self-affirmation task may produce health-related behavior change, strong conclusions cannot be drawn. It is imperative that future research examines the impact self-affirmations have on behavior change. Another

possibility could be to examine the ability for self-affirmations to enhance behavior change treatment models. If an affirmation task reduces defensiveness to health-related behavior change, incorporating an affirmation task into treatment may enhance the effectiveness of the intervention.

Another factor not addressed by self-affirmation theory is the influence that self-efficacy affirmations may have on defensive bias and behavior change. Increased self-efficacy is an important factor is alcohol abstinence (Long, Hollin, & Williams, 1998) and smoking cessation (Mcmillan, 2000). Enhancing self-efficacy through an affirmation task may result in a decrease in defensive bias and an increase in positive behavior change.

Summary

In summary, when presented with threatening information concerning one's behavior/health, individuals tend to respond in a defensive manner (i.e., minimize the threat, view personal behavior as less risky than peers, and question the accuracy of the information provided). According to self-affirmation theory, defensive bias occurs when an individual's global self worth is threatened. Self-affirmation theory states that defensive bias can be reduced by affirming another aspect of the self (i.e., reducing defensive bias about the consequences of risky sexual behavior by having participants complete a values-based affirmation task before presenting the negative consequences). In a variety of contexts (i.e., high risk sexual behavior, caffeine use, views on capital punishment), completing a self-affirmation task often reduces defensive bias. Major limitations to the theory include conflicting evidence about the role self-esteem plays in

defensive bias and limited evidence of behavioral change associated with a reduction in defensive bias.

The current study applies self-affirmation theory to a college drinking population. This study examines the impact a values-based self-affirmation task has on a heavy drinking college population's attitudes/beliefs about the consequences of binge drinking, and subsequent drinking behavior. Because self-efficacy is also an important factor for changing drinking behavior, the impact of a self-efficacy affirmation task was also examined. Lastly, this study explores the relationship between self-esteem and defensive bias.

Hypotheses

Hypothesis 1 – Reported degree of the consequences associated with college student drinking will vary based on drinking status and affirmation condition. Specifically, drinkers in the affirmation conditions will report a greater degree of negative consequences associated with college student drinking than drinkers in the no-affirmation condition (i.e., after controlling for pre-experimental beliefs, scores on the post experimental beliefs questionnaire will be higher for drinkers in the affirmation conditions than the no affirmation condition).

Hypothesis 2 – Trust in the scientific literature linking college student drinking to negative consequences will vary based on drinking status and affirmation condition. Specifically, heavy drinkers in the affirmation condition will report greater trust in the literature than heavy drinkers in the no-affirmation condition. In addition, affirmed heavy drinkers will report the same amount of trust as non-drinkers.

Hypothesis 3 – Self-esteem will impact the effect a self-affirmation task has on reducing defensive bias. Specifically, an affirmation task will reduce defensive bias only for heavy drinking participants with low self-esteem. Heavy drinking participants with high self-esteem will not demonstrate a reduction in defensive bias, regardless of affirmation condition.

Hypothesis 4 – Significant changes in behavioral intentions will be reported by heavy drinking participants in the values and self-efficacy affirmation conditions.

Hypothesis 5 – Significant changes in drinking behavior will occur from pre-test to 30-day follow-up. Specifically, heavy drinking participants in the affirmation conditions will report greater reductions in drinking behavior than heavy drinking participants in the no-affirmation condition.

CHAPTER III

III. METHODS

Participants

Three hundred-seventeen undergraduate psychology students at Oklahoma State University participated in exchange for research credit. Sixteen participants were excluded from analysis due to unusable data (i.e., participated multiple times, insufficiently completed the affirmation task, or rater disagreement about condition), leaving a total sample of three-hundred and one. Participants' mean age was 20.3 years (range = 18 – 48). The sample was 85% Caucasian (n = 256) and 75.1% female (n = 226) (Table 1).

Participants were asked about their drinking behavior during the previous month and classified as either heavy drinkers (n = 107), defined as binge drinking at least twice in the past month, light drinkers (n = 94), defined as binge drinking 0-1 time(s) in the past month, and non-drinkers (n = 100), defined as not drinking at all within the past 30 days (Table 2).

Measures

Demographics. All participants provided information about their gender, ethnicity, class, and age. To ensure confidentiality to personal responses, participants provided a unique identification number (last 3 digits of their social security number and

birth month and day). This was used to identify individuals at follow-up without using names to identify personal data.

     Pre-experimental Beliefs. Attitude and belief measures about the risks of college drinking were modeled after Sherman et al. (2000) and consisted of the following 4 items: (a) To what extent do YOU agree that there is an association between college drinking and negative consequences?; (b) In YOUR opinion, how serious is the problem of college student drinking on campuses?; (c) How at risk do YOU think that YOU are for experiencing negative consequences associated with alcohol use?; (d) How important do YOU think that something be done about drinking on college campuses? Each item was rated on a 9-point scale with higher scores indicating increased recognition of problem importance. These items were summed together to create a pre-experimental problem importance attitude score. The items had an average inter-item correlation of .48 and high reliability (Cronbach's α = .79).

     Post-experimental Beliefs. The post-experimental attitude measure was identical to the pre-experimental attitude measure with an average inter-item correlation of .40 and Cronbach's α = .72. Three additional items were added to the post-experimental attitude questionnaire: (f) How would YOU rate the scientific merit of the study findings in the article?; (g) How confident are YOU that a link between college student drinking and negative consequences has been scientifically proven?; (h) To what extent do YOU agree or disagree that there is an association between college student drinking and negative consequences? These items were also highly inter-correlated (r = .37) and produced a reliable measure (α = .63) of scientific scrutiny of the claims in the risk message. To

control for pre-experimental beliefs, separate analysis were conducted on the first four items (problem importance) and last three items (scientific scrutiny).

Drinking Behavior. Before participants completed the initial affirmation task, they were asked four questions about their drinking behavior during the past 30-days. Three questions were taken from the BASICS manual (Dimeff, Baer, Kivlahan, and Marlatt, 1999) and included questions about past month alcohol consumption, how many times in the past month they binge drank, peak drinking levels, and average drinking amount. A fourth question pertaining to binge frequency was also added. At 30-day follow-up, participants were asked these questions again.

Health Behavior. Non-drinkers completed this 6-item questionnaire, which asked about numerous health behaviors. Non-drinkers complete this form while drinkers complete the "Drinking Behavior" questionnaire.

Rosenberg Self-Esteem Scale. (Rosenberg, 1965) – This 10-item scale is a widely used measure with good reliability and validity, designed to assess self-esteem (range 10-40).

Behavioral Intentions. Using a 9-point scale participants were asked, "How likely is it that you will reduce your alcohol consumption in the near future?" with higher scores indicating greater likelihood for change.

Experimental Tasks

Values Affirmation Condition. Consistent with Cohen, Aronson, and Steele (2000), participants in the values affirmation condition completed a version of Harber's (1995) Sources of Validation Scale. Upon completion, participants were asked to

describe three or four personal experiences in which their number one ranked value had

been important to them and had made them feel good about themselves.

Self-efficacy Affirmation Condition. The self-efficacy affirmation task was

designed to increase self-efficacy and participants in this condition were asked to

describe in detail a time when they overcame a difficult situation, personal characteristics

that made it possible, and recommendations to others who are faced with similar

situations.

No Affirmation Condition. Participants in the non-affirmation condition were

given a personal recall exercise in which they were asked to recall everything they have

eaten or drank in the past 48 hours (Cohen et al., 2000). This task is frequently used as

an attention-placebo condition in the defensive bias literature as it is unlikely to result in

self-affirmation or changes in affect.

Procedure

Participants were asked to participate in an online study examining the

relationship between memory, alcohol use, and attitudes concerning college drinking.

Although memory was not of interest in this study, deception is an important component

and is often used in the defensive bias literature (Ditto & Croyle, 1995). After consenting

to participate, participants completed a questionnaire that assesses drinking behavior in

the past 30 days. Participants were then randomly assigned to the values affirmation,

self-efficacy affirmation or no-affirmation conditions. Before completing the affirmation

task, attitudes about the risks associated with college student drinking were assessed.

After completing the affirmation manipulation, all participants read, "*A Snapshot

of Annual High-Risk College Drinking Consequences*," a summary of college drinking

consequences found on the National Institute on Alcohol Abuse and Alcoholism

(NIAAA) website (NIAAA, 2003). Due to high personal relevance of the associated

undesirable consequences, this information should be threatening to moderate to heavy

drinkers but not threatening to light or non-drinkers. After reading the NIAAA

information, participants answered a number of questions regarding the relationship

between negative consequences and college alcohol use. These responses were intended

to capture attitudes and beliefs about the problem behavior, and served as the primary

dependent variables in this study.

 Following the responses to the NIAAA information, self-esteem (Rosenberg,

1965) was assessed. Self-esteem was assessed following the affirmation because previous

research has found that for some people, assessing self-esteem can act as a self-

affirmation task and reduce defensive bias (Steele et al., 1993). After self-esteem was

measured, participants were asked to recall the NIAAA information in as much detail as

possible. This was done to reinforce the idea that the study was also concerned with

memory.

Lastly, alcohol using participants were contacted via email 30 days after the

affirmation manipulation to complete the follow-up. Participants were asked about

drinking behavior within the past 30 days. Upon completion of the follow-up,

participants were thoroughly debriefed and received full research credit.

Manipulation Check

Data was checked at multiple levels to ensure accuracy. Participants in the

affirmation conditions were asked to write at least 150 words about either their most

important personal values (values affirmation task) or about a time they overcame

adversity (self-efficacy affirmation task). Participants who completed one-third or less of the affirmation task (i.e., 50 words or less), were eliminated from statistical analysis due to inadequate completion of the task. This resulted in the elimination of 11 participants.

In addition, three independent raters blind to participant condition, read the essays and assigned them to the condition they thought the participants were in to insure that participants completed the experimental task with fidelity. Participant data was eliminated if two out of three raters assigned the participant's essay to the wrong condition. This resulted in the elimination of three participants.

CHAPTER IV

IV. RESULTS

Preliminary Analysis

A factor analysis with a varimax rotation was conducted on the post-experimental

beliefs questionnaire and revealed two main factors (problem importance and scientific

scrutiny; see Table 3). Although Leffingwell et al. (2003) found three factors, this

measure is not well established, and conceptually, a two-factor solution fits the data well.

Factor one, problem importance, is related to negative consequences and personal risk

associated with college student drinking while factor two, scientific scrutiny, is related to

the confidence in the science linking negative consequences to college student drinking.

The scores on these to components were used as attitude and belief dependent variables

in subsequent analysis.

Hypothesis 1:

Reported degree of the consequences associated with college student drinking will vary

based on drinking status and affirmation condition.

A 3 (drinking status) by 3 (affirmation condition) ANOVA was conducted for

pre-experimental beliefs and revealed a main effect for drinking status, $F(2, 300) =$

$52.15, p < .001, \eta^2 = .263$. A Tukey post-hoc test indicated that all three groups differed

from each other with non-drinkers reporting the highest problem importance scores and

heavy drinkers reporting the lowest problem importance scores. A main effect was not

observed for affirmation condition, F (2, 300) = .23, p = .79, η^2 = .002. Condition by drinking interaction effects were not observed, F (4, 292) = 2.05, p = .09, η^2 = .027 (see Table 4). An additional 1 (high-binge group) by 3 (affirmation condition) ANOVA was also run to increase power and indicated marginal significance, F (2, 104) = 2.86, p = .06 (see Figure 1).

A 2 (time) by 3 (drinking status) by 3 (affirmation condition) repeated measures ANOVA was conducted for post-experimental problem importance beliefs. A main effect was observed for time, F (1, 292) = 105.27, p <.001, η^2 = .265. Participants in all groups increased their perceptions of problem importance from pre to post-test. A significant interaction between time and drinking status was also observed, F (2, 292) = 6.01, p = .003, η^2 = .04. A Tukey post-hoc test indicated that heavy drinkers changed their problem importance attitudes more than non-drinkers, F, (2, 300) = 6.25, p < .005, η^2 = .04. A significant interaction was not observed for time by affirmation condition, F (2, 292) = .33, p = .72, η^2 = .002, or for time by affirmation condition by drinking condition, F (2, 292) = .46, p = .77, η^2 = .006 (see Table 5).

Hypotheses 2:

Trust in the scientific literature linking college student drinking to negative consequences will vary based on drinking status and affirmation condition.

A 3 (drinking status) by 3 (affirmation condition) ANOVA was run for scientific scrutiny. A main effect for drinking status was found, F (2, 301) = 24.58, p < .001, η^2 = .144. A Tukey post-hoc analysis revealed that non-drinkers reported higher confidence in the science compared to light and heavy drinkers. No other significant differences were observed. A main effect was not observed for affirmation condition, F (2, 301) = .40, p =

.67, $\eta^2 = .003$. An affirmation by drinking status interaction was not observed, F (2, 292) = .68, $p = .60$, $\eta^2 = .009$ (see Table 6).

In addition, planned contrasts with only heavy binge drinkers were run to determine if the attitudes of those in the values and efficacy affirmation groups combined were different than the attitudes of those in the no-affirmation condition. This was done because the affirmation conditions should have the biggest influence on heavy drinkers. Results indicated no significant differences for either problem importance, t (104) = -.65, $p = .52$, or scientific scrutiny, t (104) = -1.23, $p = .22$

Hypothesis 3:

Self-esteem will impact the effect a self-affirmation task has on reducing defensive bias.

A median split (median score = 31) was used to divide heavy drinking participants into high versus low self-esteem groups. The mean score for low-esteem participants was 27.4 (range 20-30), while the mean score for high-esteem participants was 36.4 (range 32-40). A 2 (self-esteem) by 3 (affirmation condition) ANCOVA was run for problem importance with pre-attitudes controlled for. Significant main effects were not found for affirmation condition, F (2, 101) = .69, $p = .51$, $\eta^2 = .014$, or esteem condition, F (1, 101) = .06, $p = .80$, $\eta^2 = .001$ (see Table 7). An interaction between affirmation condition and self-esteem was not observed, F (2, 101) = .01, $p = .99$, $\eta^2 < .001$.

Scientific scrutiny was analyzed using the same 2 by 3 design without controlling for pre-attitudes. Results indicated no significant main effects for affirmation condition, F (2, 101) = .96, $p = .39$, $\eta^2 = .02$, or self esteem, F (1, 101) = .001, $p = .98$, $\eta^2 < .001$,

and no significant interaction between the two, $F (2, 101) = .15$, $p = .86$, $\eta^2 = .003$ (see

Table 8).

Hypothesis 4:

Significant changes in behavioral intentions will be reported by heavy drinking

participants in the values and self-efficacy affirmation conditions.

Does an affirmation task influence heavy binge drinker's behavioral intentions to

reduce drinking in the future? A one-way ANOVA was run using only participants in the

heavy binge drinking condition. There were no differences among values-affirmation

(4.16), self-efficacy affirmation (3.58), or no-affirmation (3.33) groups, $F (2, 104) = 1.14$,

$p = .32$.

Hypothesis 5:

Significant changes in drinking behavior will occur from pre-test to 30-day follow-up.

A total of one-hundred heavy drinking participants completed the affirmation task

and immediate post-measures. Eighty-seven also completed the 30-day follow-up. Only

heavy drinkers were analyzed for follow-up since light drinkers did not likely drink

enough to be able to determine any significant reduction in drinking behavior.

A one-way ANOVA was conducted for the mean change in each of the four

drinking variables. No significant differences were found on any of the variables (see

Table 9), however, trends favoring harm-reducing changes occurred in the affirmation

conditions could be observed across all four variables.

Because a priori hypotheses predicted that participants in the affirmation

conditions would reduce problematic drinking behavior at follow-up, planned contrasts

were run examining the drinking behavior of the values and self-efficacy heavy binge

drinking affirmation groups combined and comparing them to the heavy binge drinking

control group. No significant differences were found on any of the drinking variables

(see Table 10).

Exploratory Analysis

      Within-subject Tests.

      In addition to examining between-subject differences, it is important to determine

if participants make significant changes within their own groups. Paired sample t-tests

where used to determine if within-group pre-experimental drinking behavior differed

with 30-day follow-up drinking behavior. No within-group differences were observed for

participants in the no affirmation condition on any of the drinking variables (see Table

11).

      For participants in the values affirmation condition, significant differences were

observed in 3 out of the 4 drinking variables (see Table 12). At 30-day follow-up, these

participants drank fewer days, $t(28) = -3.199$, $p < .005$, engaged in fewer binges, $t(28) =$

-2.734, $p < .02$, and had lower peak drinking levels, $t(28) = -2.15$, $p < .05$. The last

variable, average number of drinks per session, approached significance, $t(28) = -1.979$,

$p = .06$.

      Although less pronounced, significant differences were also observed in

participants in the self-efficacy affirmation group (see Table 13). At 30-day follow-up,

these participants drank fewer days, $t(25) = -2.947$, $p < .01$, and had lower peak drinking

levels, $t(25) = -3.059$, $p < .01$. Number of binges approached significance, $t(25) = -$

1.702, $p = .10$, while there were no differences in average number of drinks per session, t

$(25) = -1.319$, $p = .20$.

Tests with More Extreme Group.

Although past research has defined high-risk binge drinking as 2 or more binges a month, it is possible that only heavier binge drinkers would benefit from the affirmation task. The consequences of risky drinking behavior may be more relevant to this group and therefore produce more defensive bias. These analysis examined attitudes and behavior of participants who binge drank 5 or more times in the past month. This pattern of drinking was chosen because these participants were likely to have binge drank at least once a week or more.

An ANCOVA was conducted for problem importance while controlling for pre-experimental problem importance attitudes. No between-group differences were found, F $(2, 58) = .02$, $p = .98$, $\eta^2 = .001$. Identical analysis were run for scientific scrutiny without controlling for pre-experimental problem importance attitudes and no significance was found, $F (2, 58) = 1.61$, $p = .21$, $\eta^2 = .055$.

Next, drinking behavior for the high-risk drinkers was examined. A one-way ANOVA was conducted for the mean change in each of the four drinking variables. Significant differences were not found for number of drinking days, number of binges, peak drinking levels, or average drinking levels (see Table 14).

CHAPTER V

V. DISCUSSION

The purpose of this study was to understand the role that two different types of affirmation tasks (values-oriented and self-efficacy oriented) would have on college drinking related attitudes and drinking behavior. Participants completed one of three affirmation tasks (values-affirmation, self-efficacy affirmation, or no affirmation) before reading information regarding the negative consequences of college alcohol use. Attitudes related to college drinking were then reported. In addition, drinking behavior was examined before the affirmation task and 30-days after the affirmation task. Results generally did not support self-affirmation theory. Significant between group differences were not observed in drinking related attitudes and behavior. Within group differences, however, suggest that an affirmation task did reduce drinking behavior.

Before completing the affirmation task, all participants were asked about their attitudes related to the consequences of college drinking (i.e., problem importance). As expected, non-drinkers reported greater problem importance attitudes than heavy drinkers. Light drinkers ratings of problem importance generally fell between non-drinkers and heavy drinkers. This finding indicates that pre-message defensiveness exists among high-relevance groups in regard to real-world behavioral health issues. Previously in the defensive bias literature, most studies either ignore the issue of pre-existing beliefs or choose novel behavior-risk messages that participants may have never before formed

an opinion. This situation is, of course, unlikely to exist in the real world where health-risk messages are pervasive for most major health-related behaviors (e.g., diet, exercise, tobacco, etc.).

A limitation from past studies examining post-experimental beliefs is the failure to control for pre-experimental beliefs. If only post-experimental beliefs were examined in this study, one may conclude that while not statistically significant, a values affirmation task resulted in greater acknowledgement of the risks associated with binge drinking. Controlling for pre-experimental beliefs, however, revealed that the least amount of attitude change was observed in the values oriented affirmation condition. This finding further supports the idea that pre-experimental beliefs must be controlled for when assessing post-experimental attitudes.

In addition, when comparing the pre-experimental beliefs of only the heavy drinkers, marginal significance was observed indicating a possible failure of randomization. Participants in the values affirmation group rated problem importance over three points higher than participants in the self-efficacy affirmation group, while those in the no-affirmation condition were in-between the affirmation groups. If pre-experimental attitudes were not assessed for, it would have been difficult to understand the effect a self-affirmation task had on post-experimental attitudes. This finding highlights the need for assessing and controlling for pre-existing attitudes.

Hypothesis 1 stated that after controlling for pre-experimental beliefs, heavy drinkers in the values and self-efficacy based affirmation conditions would report a greater acknowledgement of the risks associated with binge drinking than heavy drinkers in the no-affirmation condition. This hypothesis was not supported. Heavy drinkers in

all affirmation conditions reported similar attitudes about the consequences of binge

drinking. In fact, after controlling for pre-experimental beliefs, no significant differences

were found between any groups, regardless of drinking status or affirmation condition.

Further analysis revealed that all groups reported a similar increase in the rating of

problem importance from pre-test to post-test. This finding was surprising in two

respects. First, it was surprising to see an impact on the non-drinking group who already

held strong beliefs about the hazards of alcohol use by college students. Second, it was

surprising to observe an effect of the risk message upon attitudes for the self-relevant

groups in the absence of an affirmation task. Theoretically, the message should have

elicited defensive bias resulting in little impact of the message, or possibly even a

reactant response of diminished problem importance in the non-affirmed groups.

In addition to attitudes related to the risks associated with college student

drinking, participants were asked about their confidence in the scientific literature linking

binge drinking to negative consequences (i.e., scientific scrutiny). Hypothesis 2 stated

that heavy drinkers in the no-affirmation condition will report less confidence in the

scientific literature than heavy drinkers in either affirmation condition. This hypothesis

was not supported. While heavy drinkers in both affirmation conditions reported more

confidence in the science than non-affirmed heavy drinkers, the differences were not

statistically significant. However, non-drinkers reported more confidence in the scientific

literature that the heavy drinking no-affirmation group, suggesting that without an

affirmation task, heavy drinkers engaged in a greater amount of defensive bias. The

amount of defensive bias was reduced if heavy drinkers received an affirmation task, but

not enough to differ significantly from the heavy drinking no-affirmation group.

These results differ from Reed and Aspinwall (1998) and Sherman et al. (2000, Study 1 and 2), which found an affirmation task did reduce defensive bias. It could be argued that since Reed and Aspinwall (1998) and Sherman et al. (2000, Study 1) did not assess for pre-experimental beliefs, their results are questionable. However, Sherman et al. (2000, Study 2) did assess for pre-experimental beliefs and found that an affirmation task significantly reduced defensive bias even after controlling for pre-experimental beliefs. Although it is unclear why an affirmation task did not produce greater attitude change with this population, it's possible that beliefs about alcohol use are more resistant to change than other types of beliefs (i.e., caffeine use and risky sexual behavior).

According to self-affirmation theory, high self-esteem provides a buffer against threatening information. Therefore, participants with high self-esteem should demonstrate increased acceptance of the risks associated with college drinking regardless of affirmation condition while participants with low self-esteem should show increased acceptance only after an affirmation task. Hypothesis 3 stated that an affirmation task would reduce defensive bias only in participants with low self-esteem. This hypothesis was not supported. Self-esteem did not appear to be related to defensive bias. This is in contrast to Chung and Sherman (2003) who found that an affirmation task reduced defensive bias only in participants with low self-esteem.

While these results did not support self-affirmation theory, they did not support the consistency model either. The consistency model states that individuals with high self-esteem would be more defensive because risky or unhealthy behavior is not consistent with their self-concept. These results indicated that self-esteem was not related to defensive bias or a self-affirmation task. It should be noted, however, that

Steele et al. (1993) found that a self-affirmation task was influenced by self-esteem only when self-esteem was made salient before the affirmation task. Because the current study examined self-esteem after the affirmation task, it is possible that the effects of self-esteem were not observed because self-esteem was not made salient before the affirmation task.

After completing the affirmation task and post-test measures, heavy drinking participants were asked if they intended to reduce their alcohol consumption. No significant differences between affirmation conditions were found. This is in contrast to Sherman et al. (2000, Study 1), who found that after an affirmation task, affirmed coffee drinkers reported greater intentions to reduce caffeine use when compared to non-affirmed coffee drinkers. Furthermore, when comparing this study directly to Sherman's, non-affirmed participants in this study reported greater behavior change intentions than non-affirmed participants in Sherman et al.'s study. Also, affirmed participants in this study reported fewer intentions to change their behavior than affirmed participants in Sherman et al's study.

Hypothesis 4 stated that heavy drinking participants in the affirmation conditions would reduce their drinking at 30-day follow-up to a greater extent than heavy drinking participants in the no-affirmation condition. This hypothesis was not supported. At 30-day follow-up, no differences between the three affirmation groups were observed for the number of binges, peak consumption, average consumption, or number of days drinking during the past 30 days. Several reasons for these findings are possible. First, a reduction in drinking behavior amongst heavy drinkers occurred across all affirmation conditions. Second, while participants in the affirmation conditions reported a greater

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decrease in drinking behavior compared to participants in the no-affirmation condition, a large amount of variability between participants occurred. For example, participants reported as much as a 20 drink reduction at 30-day follow-up. These large changes in drinking behavior occurred in all conditions and inflated the standard deviations. Careful inspection of the data could not detect any patterned or random responding, however, the large standard deviations undoubtedly impacted the ability to detect significant between group differences.

Lastly, past studies have not examined the impact a self-affirmation task had on behavior change, making it is difficult to predict if and how much of an effect an affirmation task has on behavior change. These results suggest that an affirmation task does impact behavior, but to a smaller degree than the attitude changes observed in previous studies. A larger sample size would increase the power to detect a smaller effect size and likely result in significant between-group differences in drinking behavior at 30-day follow-up.

In addition to examining differences in follow-up drinking behavior between affirmation groups, within-group differences were also examined. While no differences were observed in drinking behavior between groups, significant changes were found in the follow-up drinking behavior within-groups. The most within-group reductions in drinking behavior were observed in the values affirmation group. Participants in this condition averaged two less binges in the past month, reduced peak and average consumption by over one and a half drinks, and drank almost 2 fewer days in the past month.

While the values group experienced the most reductions in drinking behavior, the self-efficacy affirmation condition also reported reductions in drinking behavior. This group reported an almost three drink reduction in peak alcohol consumption and drank more than 2 fewer days in the past month. Lastly, while the no affirmation group reported reductions in drinking behavior, the reductions were smaller than the other affirmation groups and not large enough to reveal significant within group differences.

Another important point is that an alcohol assessment has been shown to reduce drinking behavior (Agostinelli, Brown, and Miller, 1995). Reporting behaviors related to alcohol use may have served as an assessment for the heavy drinking population and reduced overall drinking behavior. While it appears that engaging in an affirmation task reduced drinking behavior to a greater extent than an assessment alone, because large changes in drinking behavior were reported by some participants, significant between group differences were not observed. When examining each condition separately, however, the overall variability was reduced, revealing significant reductions in drinking behavior for the values and self-efficacy affirmation groups.

The attitudes and drinking behavior of high-risk drinkers, those who reported binge-drinking 5 or more times in the past month, were also examined. No differences between affirmation conditions were observed for problem importance or scientific scrutiny. From pre-test to post-test, problem importance scores increased an average of about four points, regardless of affirmation condition. While not significant, differences in scientific scrutiny scores were observed. The values affirmation condition resulted in the greatest confidence in the scientific literature concerning college drinking. This was observed in the original sample, but was even more pronounced with the high-risk

sample. For example, a 1.05 point difference between no-affirmation group and value affirmation group was observed in the original sample, while the high risk group observed almost twice the difference (1.95 point difference). In addition, for the high risk drinkers, the confidence in the science decreased in the no-affirmation group (indicating an increase in defensive bias) and increased in the values affirmation group (indicating a decrease in defensive bias). This suggests that the values affirmation task had an even bigger impact on the scientific scrutiny attitudes of high-risk drinkers. It may be that the high-risk group is more threatened by the message and an affirmation task is more likely to decrease that threat.

Changes in drinking behavior were also examined for high-risk drinkers. No differences were observed across affirmation group. Compared to the original heavy drinking sample, high-risk drinkers reported similar reductions in drinking behavior. However, high-risk drinkers in the values affirmation condition reported fewer changes in peak and average consumption than the original heavy drinking population. It is unclear why this occurred, since the affirmation task should have been particularly helpful at reducing defensive bias for heavier drinkers. One possibility is that the effectiveness of an affirmation task peaks with moderate/heavy drinkers and is less effective for very heavy or very light drinkers. However, this is inconsistent with the finding that high risk drinkers reported even less defensive bias for scientific scrutiny than the original heavy drinking sample.

This study contains several limitations. First, the majority of participants were Caucasian female college students. Although after controlling for pre-experimental

beliefs no affirmation studies have reported gender differences, it is possible that female college students respond differently to an affirmation task than male college students.

Self-affirmation also appears to be influenced by cultural factors. For example, Heine and Lehman (1997) found that Asian participants who identified with Asian culture did not respond the same way as participants who identified more with western culture. Because the majority of self-affirmation research has been conducted with Caucasian participants from western culture, it is unlikely cultural differences influenced the results of this study.

This study was also restricted to a college population. While other studies have examined the effect of a self-affirmation task in a college population (Reed & Aspinwall, 1998; Sherman et al., 2000, Study 1 and 2), no studies have looked at the effect an affirmation task has on attitudes about alcohol use and drinking behavior. An affirmation task may be less effective in this population. In addition, an older adult sample of drinkers may respond differently to an affirmation task than a college drinking sample. Future research should include a more diverse sample (i.e., an equal number of males and females, participants from a diverse cultural background, and an older adult drinking population).

Lastly, past self-affirmation studies were conducted in a laboratory based setting while this study was conducted using the internet. Because this study was internet based, there is no way of knowing under what conditions the participants participated. For example, environmental distractions could have prevented some participants from devoting their full attention to the study, some participants could have intentionally

answered randomly to quickly finish, or some participants could have participated multiple times to receive additional research credit.

Several steps were taken to reduce these potential problems. First, participants were asked on a nine-point scale, how much effort they devoted to the study, with higher scores indicating a greater degree of effort. No significant differences between groups were noted, meaning that all groups reported a similar degree of effort. Furthermore, the mean effort score was over seven points, indicating that participants put a significant amount of effort into completing this study.

Next, participants were asked to write a minimum number of words for the affirmation task. This was done to increase the likelihood that participants would attempt a meaningful response to the affirmation task. Participants who completed less than one-third of the required minimum were excluded from analysis. This was done to eliminate participants who attempted to quickly finish the study without thinking about the affirmation task. It seems unlikely given these checks that lack of fidelity of the task or lack of participant effort could have significantly impacted the conclusions drawn from this study.

Finally, participants who completed the experiment more than once were eliminated from the study. Out of over three hundred participants, only two participants completed the study more than once indicating that participating multiple times was not a problem for this study. In addition, a recent review of web-based studies found that the results from internet based studies are consistent with findings from traditional methods (Gosling, Vazire, Srivastava, and John, 2004). Therefore, it is unlikely that the methods used in this study negatively impacted the results.

This study attempted to understand the effect two different affirmation tasks would have on college student drinkers attitudes about the risks associated with drinking and their subsequent drinking behavior. Limited evidence suggests that an affirmation task may be helpful in changing drinking related attitudes and behavior. First, although non-significant, attitudes about the science behind college drinking studies may have been influenced by the affirmation task. The values affirmation group reported the greatest confidence in the science while the no-affirmation group reported the least amount of confidence. This finding was even greater for the high-risk drinkers (5 or more binges in the past 30-days). With a larger sample and increased power, it is likely that significant differences would be observed.

Changes in drinking behavior were observed across all conditions. Although between group differences were not significant, within-group differences were observed in both the values and self-efficacy affirmation groups. The values affirmation group reported the greatest reductions in drinking behavior, followed by the self-efficacy affirmation group. One interesting observation is the large changes in some participants drinking behavior at 30-day follow-up. Across all three conditions, some participants reported as much as a twenty drink reduction. Although it is unclear why such dramatic changes in drinking behavior occurred, future studies should attempt to better understand why such drastic changes occur in some participants.

Another interesting finding is that the affirmation tasks appeared to have a greater impact on behavior rather than attitudes. Minimal evidence suggested that participants changed their drinking related attitudes after an affirmation task and no evidence suggested that an affirmation task influenced behavior intentions to reduce alcohol use.

However, evidence did suggest that completing a values or self-efficacy affirmation task reduced drinking behavior at 30-day follow-up. Since attitudes are usually easier to change than behavior, it is unclear why greater changes were observed in drinking behavior. One possibility is that the affirmation task had a delayed effect of reducing defensiveness for later processing of alcohol use behavior.

Lastly, since this study was designed to have the power to detect similar effect sizes as previous self-affirmation studies, it is possible that compared to previously studied topics, an affirmation task has less of an effect on alcohol related attitudes and behavior. However, the importance of this effect should not be discounted. Even small changes in drinking behavior could result in a decrease in the consequences of risky drinking behavior. Because an affirmation task is easy to implement, it may be a cost effective way of minimizing the consequences associated with risky drinking behavior. One possibility would be using an affirmation task to enhance brief motivational interventions. Since drinkers often receive potentially threatening information (i.e., the negative consequences of their drinking behavior), an affirmation task may help reduce defensive bias and enhance the intervention. Regardless of how it may be implemented, a self-affirmation task deserves continued attention in the field of substance abuse.

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APPENDICES

APPENDIX A – INFORMED CONSENT FORM

Alcohol & Memory Survey

Informed Consent Information

This project is designed to understand the association between attitudes about alcohol, alcohol use, and memory. This project is being conducted by Christopher Neumann, a graduate student in the Department of Psychology at Oklahoma State University. This project is approved by OSU's Institutional Review Board.

If you choose to participate, you will complete an on-line questionnaire that includes questions about your own use of alcohol and attitudes about risks associated with alcohol use. You will also be asked to recall what you read as well as recall specific life events. This questionnaire should take less than 30 minutes to complete. In addition, you will be contacted via email approximately 30 days after completing this questionnaire to complete a 5-minute follow-up questionnaire.

The risks of this study are minimal and do not exceed those ordinarily encountered in daily life.

Your individual responses to the survey will be anonymous. The information you submit will be sent to a password protected file on our server, which will only be accessible to the researchers. Several times each week the data will be removed from the server. Your name or any other identifying information will not be associated with any of the data you provide.

Your participation is voluntary. There is no penalty for choosing to not participate. If you are eligible for research credit in a course due to your participation, the instructor of that course will make optional comparable activities available. You may choose to not participate now, or at any time during your participation. If you choose to participate, you will be asked to provide responses to all items on the survey. If you are uncomfortable responding to any of the items, you may choose to not participate at all without penalty. If you choose to participate, the primary benefit to you will be 1 hour of research credit. After completing the survey, you will be directed to a page that will ask you to submit your name, student number, and other information to allow us to make sure you are given appropriate credit for your participation.

If you have any questions or need to report an effect about the research procedures, you may contact Thad R. Leffingwell, Ph.D. at (405) 744-7494 or 215 North Murray, Stillwater, OK 74078. If you have any questions about your rights as a research participant, you may take them to the Executive Secretary of OSU's Institutional Review Board at (405) 744-5700 or 415 Whitehurst, Stillwater, OK 74078

APPENDIX B – RECRUITMENT SCRIPT

You are invited to participate in an **internet based study** regarding alcohol, attitudes and memory. All students 18 years and older may participate – **you do not need to drink alcohol to be eligible to participate in this study**. If you choose to participate you will complete a 30-minute questionnaire followed by a 5-minute follow up questionnaire one month later. You will receive 1 hour of research credit upon completion of the follow-up questionnaire. YOU MUST COMPLETE BOTH THE INITIAL QUESTIONNAIRE AND THE FOLLOW-UP TO RECEIVE RESEARCH PARTICIPATION CREDIT. You will be contacted by email with instructions to complete the follow-up online. If interested please go to:

https://experimetrix2.com/okstate/

APPENDIX C – QUESTIONNAIRE PACKET

Alcohol and Memory Study
behavior change laboratory   oklahoma state university

You must answer all questions to successfully submit the survey!

Demographic information

Last three digits of your social security number: ☐

Birth Month: [- choose one - ▼]   Birth Day: [- choose one - ▼]

Gender: ☐ male ☐ female

Ethnicity: [- choose one - ▼]

Class: [- choose one - ▼]

Age: ☐

In your opinion, *how serious* is the problem of college student drinking on campuses?

Not at all Serious ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very Serious**

How important do YOU think it is that *something be done* about drinking on college campuses?

Not at all Important ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very Important**

How at risk do YOU think YOU are for experiencing negative consequences associated with college student drinking?

Minimal Risk ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **High Risk**

To what extent do YOU agree or disagree that there is an association between college student drinking and negative consequences?

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

Alcohol Use

For the following questions, *one drink* equals:

- 4 ounces of wine
- 1 wine cooler
- 12 ounces of "3-2" beer
- 8-10 ounces of "6-point" beer, malt liquor, ice beers, or "microbrew" beers
- A mixed drink with 1 ounce of liquor
- A single shot of liquor

Instructions: Please describe your drinking behavior below.

How often in the past month did you drink alcohol? ⬇

How many times in the past month did you consume 4 or more alcoholic beverages (if female) or 5 or more alcoholic beverages (if male) in one occasion? _____ times

Think of the **occasion you drank the most** this past month. How much did you drink? ⬇

On **an average weekend evening**, how much alcohol do you typically drink? Estimate for the past month. ⬇

College Drinking Hazardous to Campus Communities

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) recently commisioned a number of studies to evaluate the problem of college student drinking on campuses. The following summarizes their findings.

College students most at risk for alcohol related problems are those who engage in binge drinking. Binge drinking is defined as *five or more drinks in a row for men and four or more drinks for women*.

- The consequences of excessive and underage drinking affect virtually all college campuses, college communities, and college students, whether they choose to drink or not.
- *Death*: 1,400 college students between the ages of 18 and 24 die each year from alcohol-related unintentional injuries, including motor vehicle crashes (Hingson et al., 2002).
- *Injury*: 500,000 students between the ages of 18 and 24 are unintentionally injured under the influence of alcohol (Hingson et al., 2002).
- *Assault*: More than 600,000 students between the ages of 18 and 24 are assaulted by another student who has been drinking (Hingson et al., 2002).
- *Sexual Abuse*: More than 70,000 students between the ages of 18 and 24 are victims of alcohol-related sexual assault or date rape (Hingson et al., 2002).
- *Unsafe Sex*: 400,000 students between the ages of 18 and 24 had unprotected sex and more than 100,000 students between the ages of 18 and 24 report having been too intoxicated to know if they consented to having sex (Hingson et al., 2002).

(continued from above)

- *Academic Problems*: About 25 percent of college students report academic consequences of their drinking including missing class, falling behind, doing poorly on exams or papers, and receiving lower grades overall (Engs et al., 1996; Presley et al., 1996a, 1996b; Wechsler et al., 2002).
- *Health Problems/Suicide Attempts*: More than 150,000 students develop an alcohol-related health problem (Hingson et al., 2002) and between 1.2 and 1.5 percent of students indicate that they tried to commit suicide within the past year due to drinking or drug use (Presley et al., 1998).
- *Drunk Driving*: 2.1 million students between the ages of 18 and 24 drove under the influence of alcohol last year (Hingson et al., 2002).
- *Vandalism*: About 11 percent of college student drinkers report that they have damaged property while under the influence of alcohol (Wechsler et al., 2002).
- *Property Damage*: More than 25 percent of administrators from schools with relatively low drinking levels and over 50 percent from schools with high drinking levels say their campuses have a "moderate" or "major" problem with alcohol-related property damage (Wechsler et al., 1995).
- *Police Involvement*: About 5 percent of 4-year college students are involved with the police or campus security as a result of their drinking (Wechsler et al., 2002) and an estimated 110,000 students between the ages of 18 and 24 are arrested for an alcohol-related violation such as public drunkenness or driving under the influence (Hingson et al., 2002).
- *Alcohol Abuse and Dependence*: 31 percent of college students met criteria for a diagnosis of alcohol abuse and 6 percent for a diagnosis of alcohol dependence in the past 12 months, according to questionnaire-based self-reports about their drinking (Knight et al., 2002).

To what extent do YOU agree or disagree that there *is an association between college drinking and the consequences* cited in the article you read?

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

How *important* do YOU think it is that people reduce their drinking in order to avoid these consequences?

Not at all Important ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very Important**

In YOUR opinion, *how serious* is the problem of college student drinking on campuses?

Not at all Serious ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very Serious**

How *at risk* do YOU think YOU are for experiencing the consequences cited in the article?

Minimal Risk ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **High Risk**

How important do YOU think it is that *something be done* about drinking on college campuses?

Not at all Important ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very Important**

How would YOU rate the *scientific merit* of the study findings cited in the article above?

Very Unscientific ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very Scientific**

How confident are YOU that a link between college student drinking and negative consequences has been *scientifically proven*?

Not at all Confident ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very Confident**

Instructions*: Below is a list of statements dealing with your general feelings about your abilities. Please read each question and select the best answer.*

I can always manage to solve difficult problems if I try hard enough.

If someone opposes me, I can find the ways and means to get what I want.

I am certain that I can accomplish my goals.

I am confident that I could deal efficiently with unexpected events.

Thanks to my resourcefulness, I can handle unforeseen situations.

I can solve most problems if I invest the necessary effort.

I can remain calm when facing difficulties because I can rely on my coping abilities.

When I am confronted with a problem, I can find several solutions.

If I am in trouble, I can think of a good solution.

I can handle whatever comes my way.

On the whole, I am satisfied with myself.

At times, I think I am no good at all.

I feel that I have a number of good qualities.

I am able to do things as well as most other people.

I feel I do not have much to be proud of.

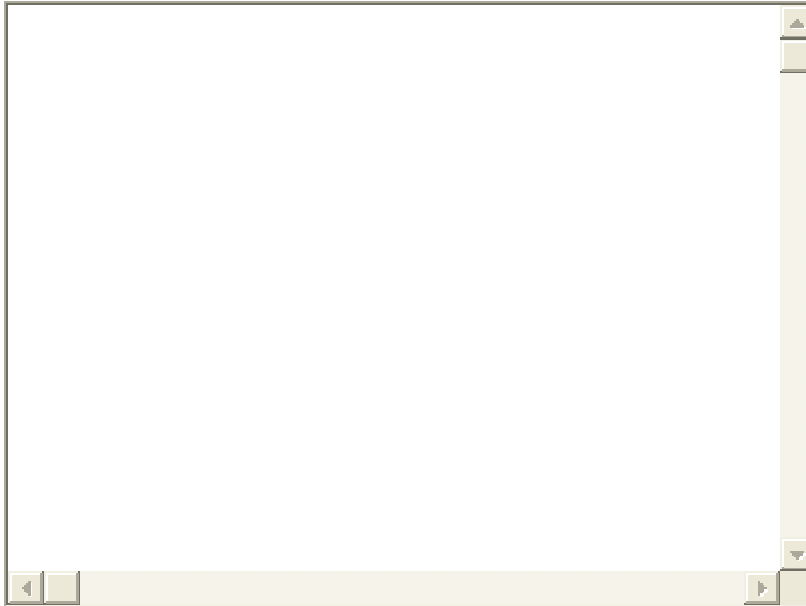I certainly feel useless at times.

I feel that I'm a person of worth, at least on an equal plane with others.

I wish I could have more respect for myself.

All in all, I am inclined to feel that I am a failure.

I take a positive attitude toward myself.

Instructions: The following section tests your ability to recall the information you have read concerning the consequences of college alcohol use. Please recall in as much detail the contents of the NIAAA findings about college drinking. Use the space below to write as much information that you can recall. **IMPORTANT: Please do not press the ENTER key**

I devoted alot of effort in completing this questionnaire.

Strongly Disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Strongly Agree**

How *likely* is it that you will reduce your alcohol consumption in the near futur*e* ?

Not at all likely ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very likely**

How concerned are you about the information you read about college student drinking?

Not at all concerned ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very concerned**

How much do you feel personally threatened by the information about the consequences of college student drinking?
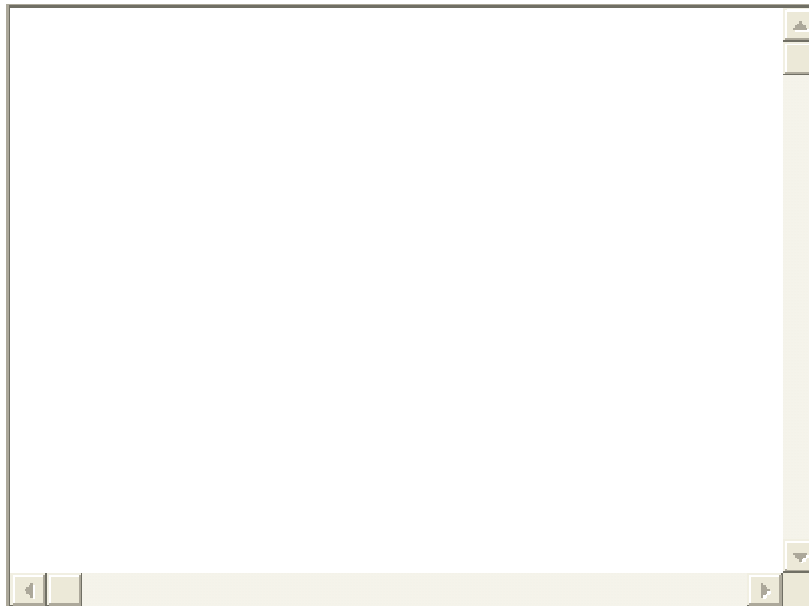
Not at all threatened ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ **Very threatened**
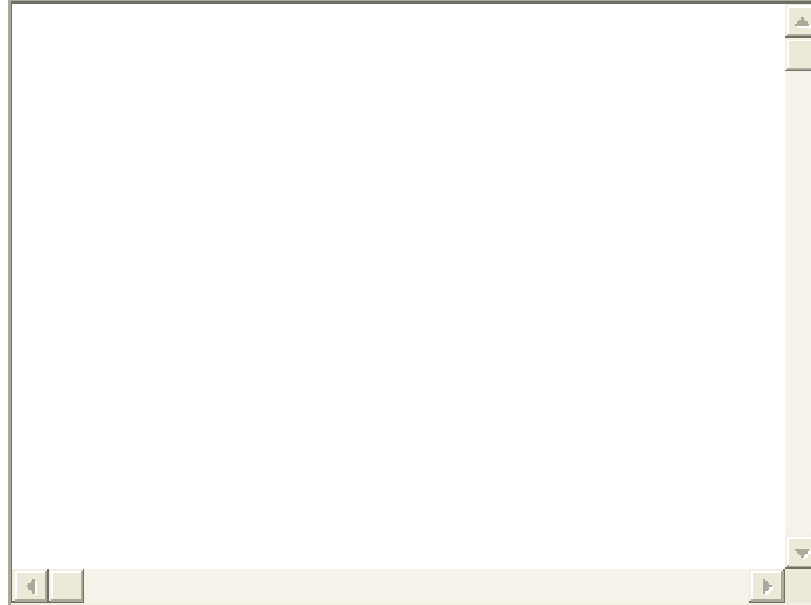
Values and Memory

Instructions. **This section addresses memory concerning personally important events.Please take your time and answer the following questions. Provide as much detail as possible.**
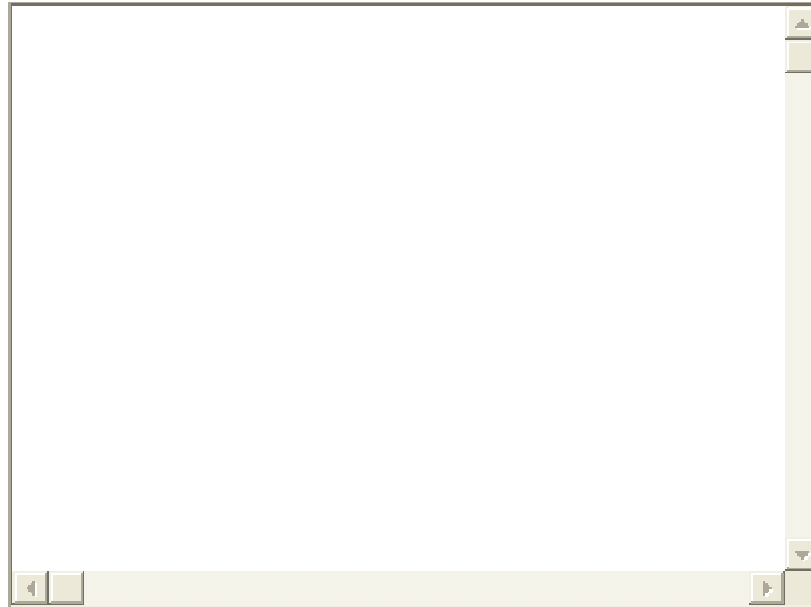
Describe *(in as much detail as possible)* a time when you overcame an obstacle or completed an extremely difficult task. Your response should be at least 150 words. (Describe below). **IMPORTANT: Please do not press the ENTER key**

What characteristics do you possess that made your accomplishment possible? Your response should be at least 150 words. (Describe below)**IMPORTANT: Please do not press the ENTER key**

What recommendation would you make for someone else faced with a similar challenge? Your response should be at least 150 words.(Describe below) **IMPORTANT: Please do not press the ENTER key**

APPENDIX E – VALUES AFFIRMATION TASK

Values and Memory

Instructions. This section addresses personal values and memory concerning value-relevant events. Below is a list of characteristics and values, some of which may be inportant to you, some of which may be unimportant. Please select the value that is most important to you.

☐ Artistic Skills/Aesthetic Apprecation

☐ Sense of Humor

☐ Relations with Friends/Family

☐ Spontaneity/Living in the moment

☐ Social Skills

☐ Athletics

☐ Musical Ability/Appreciation

☐ Physical attractiveness

☐ Creativity

☐ Business/Managerial skills

☐ Romantic values

Instructions: *Please describe three or four personal experiences in which YOUR number one ranked value had been important to YOU and made YOU feel good about yourself. Please write at least 150 words.* **IMPORTANT: Please do not press the ENTER key**
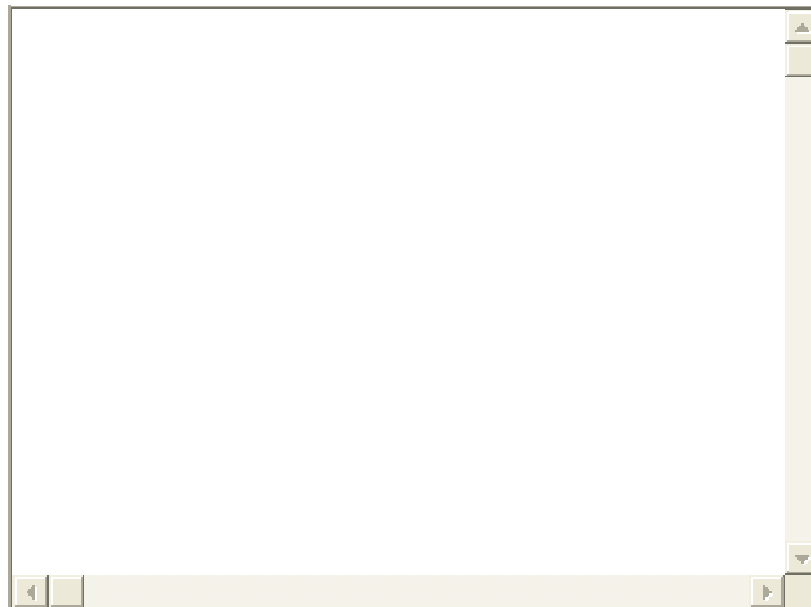
APPENDIX F – NO AFFIRMATION CONDITION

Recent personal events and Memory

Instructions. *This section addresses memory of recently occuring personal events.Please record everything you have eaten and drank in the past 48 hours. Provide as many details as possible but don't worry about things you find yourself unable to remember. (Describe below)*
IMPORTANT: Please do not press the ENTER key

APPENDIX G – IRB APPROVAL FORM

Oklahoma State University
Institutional Review Board

Protocol Expires: 12/2/2004

Date: Wednesday, December 03, 2003   IRB Application No   AS0429

Proposal Title: Alcohol, Attitudes, and Memory

Principal
Investigator(s):

Christopher Neumann   Thad Leffingwell
215 N Murray   215 N. Murray
Stillwater, OK 74078   Stillwater, OK 74078

Reviewed and
Processed as: Expedited

Approval Status Recommended by Reviewer(s): Approved

Dear PI :

Your IRB application referenced above has been approved for one calendar year. Please make note of
the expiration date indicated above. It is the judgment of the reviewers that the rights and welfare of
individuals who may be asked to participate in this study will be respected, and that the research will be
conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol
   must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar
   year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are
   unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved projects are subject to monitoring by the IRB. If you have questions about the
IRB procedures or need any assistance from the Board, please contact me in 415 Whitehurst (phone:
405-744-5700, colson@okstate.edu).

Sincerely,

Carol Olson, Chair
Institutional Review Board

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Table 1.

I. Participant characteristics.

	Non-Drinkers	Light Drinkers	Heavy Drinkers	Total Sample
<u>Gender</u>				
Male	21 (7.0%)	16 (5.3%)	38 (12.6%)	75 (24.9%)
Female	79 (26.2%)	78 (25.9%)	69 (22.9%)	226 (75.1%)
<u>Age</u> [a]	20.4 (4.3)	20.5 (3.5)	19.9 (3.0)	20.3 (3.6)
<u>Ethnicity</u>				
African-American	5 (1.7%)	4 (1.3%)	0 (0.0%)	9 (3.0%)
Asian-American	1 (0.3%)	0 (0.0%)	5 (1.7%)	6 (2.0%)
Caucasian	83 (27.6%)	79 (26.2%)	94 (31.2%)	256 (85.0%)
American Indian	2 (0.7%)	7 (2.3%)	5 (1.7%)	14 (4.7%)
Hispanic	2 (0.7%)	1 (0.3%)	0 (0.0%)	3 (1.0%)
Other	7 (2.3%)	3 (1.0%)	2 (0.7%)	12 (4.0%)
No response	0 (0.0%)	0 (0.0%)	1 (0.3%)	1 (0.3%)

[a] mean (standard deviations) in years.

Table 2.

II. Number of participants in each condition.

Condition	Non-Drinkers	Light Drinkers	Heavy Drinkers	Total
No-Affirmation	36	34	43	113
Values Affirmation	29	27	31	87
Self-efficacy Affirmation	35	33	33	101
Total	100	94	107	

Table 3.

III. Post-attitudes measure standardized loadings.

Item	Components	
	1	2
Importance of reducing drinking to avoid negative consequences	**.77**	.28
How serious is the problem of college student drinking	**.83**	.31
How at risk are you for experiencing negative consequences associated with drinking	**.54**	-.02
Should something be done about drinking on college campuses	**.86**	.27
Association between college student drinking and negative consequences	.38	**.63**
Rate the scientific merit of the study finding in the article	.05	**.86**
Confidence that a link between college student drinking and negative consequences has been scientifically proven.	.18	**.79**

Note: Items in bold loaded on component and were summed to create a composite score.

Table 4.

IV. Pre-experimental attitudes about college student drinking (higher scores indicate greater perceived problem importance).

Condition	Non-drinkers	Light Drinkers	Heavy Drinkers	Total
No-Affirmation	24.67 (5.60)	21.32 (6.53)	16.74 (6.08)	20.65 (6.88)
Values Affirmation	24.76 (6.04)	20.52 (4.69)	19.13 (5.67)	21.44 (5.97)
Self-efficacy Affirmation	26.69 (5.70)	20.97 (5.13)	15.82 (5.25)	21.27 (6.97)
Total	25.37 (5.78)$_a$	20.94 (5.53)$_b$	17.23 (5.82)$_c$	

Note: Means in the same row that do not share subscripts differ at $P < .05$ in the Tukey HSD comparison.

Table 5.

V. Post-experimental problem importance attitudes.

Condition	Non-drinkers	Light Drinkers	Heavy Drinkers	Total
No-Affirmation	26.52 (5.60)	24.26 (5.85)	20 .35 (6.48)	23.41 (6.49)
Values Affirmation	26.38 (4.69)	22.81 (5.48)	22.03 (5.92)	23.72 (5.87)
Self-efficacy Affirmation	28.14 (5.39)	23.27 (4.16)	20.24 (5.97)	23.97 (5.94)
Total	26.92 (5.62)$_a$	23.45 (5.19)	20.88 (6.16)$_b$	

Note: Means in the same row that do not share subscripts differ at $P < .05$ in the Tukey HSD comparison.

Table 6.

VI. Post-experimental scientific scrutiny attitudes.

Condition	Non-drinkers	Light Drinkers	Heavy Drinkers	Total
No-Affirmation	21.64 (3.42)	19.26 (4.63)	17.65 (4.37)	21.89 (4.46)
Values Affirmation	21.66 (2.66)	19.19 (3.42)	19.10 (3.92)	19.10 (3.55)
Self-efficacy Affirmation	22.37 (2.99)	18.85 (3.05)	18.30 (4.54)	18.35 (4.00)
Total	21.90 (3.05)$_{a,b}$	19.10 (3.76)$_a$	18.27 (4.30)$_b$	

Note: Means in the same row that do not share subscripts differ at $P < .05$ in the Tukey HSD comparison.

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Table 7.

VII. Mean problem importance scores: Self-esteem by affirmation condition (heavy drinkers).

| Self-esteem | Affirmation Condition | | | Total |
	No-Affirmation	Values Affirmation	Self-efficacy Affirmation	
Low	19.88 (5.30)	21.45 (6.02)	20.14 (4.20)	21.28 (5.08)
High	20.09 (7.48)	22.00 (5.95)	20.35 (7.13)	20.13 (6.86)
Total	20.00 (6.57)	21.80 (5.88)	20.26 (5.90)	

Table 8.

VIII. Mean scientific scrutiny scores: Self-esteem by affirmation condition (heavy drinkers).

Self-esteem	Affirmation Condition			Total
	No-Affirmation	Values Affirmation	Self-efficacy Affirmation	
Low	17.18 (4.65)	18.91 (3.42)	18.57 (3.94)	18.10 (4.10)
High	17.70 (4.41)	18.95 (4.21)	17.94 (5.18)	18.17 (4.34)
Total	17.48 (4.47)	18.93 (3.88)	18.23 (4.59)	

Table 9.

IX. Mean changes in drinking behavior from pre-test to 30-day follow-up.

	Affirmation Condition					
	No-Affirmation	Values Affirmation	Self-efficacy Affirmation	F	p	η^2
# of past month binges	-1.17 (4.70)	-2.10 (4.14)	-1.42 (4.26)	.35	.71	.009
past month peak consumption	-.98 (4.35)	-1.59 (4.34)	-2.88 (4.81)	1.39	.26	.032
past month average consumption	-.84 (5.35)	-1.66 (4.50)	-.94 (3.64)	.27	.76	.006
past month # of drinking days	-1.17 (4.08)	-1.93 (3.25)	-2.02 (3.49)	.49	.61	.012

Table 10.

X. Mean reductions in drinking behavior from pre-test to 30-day follow-up.

| | Affirmation Condition | | | |
	Combined Affirmation	No Affirmation	*t*	*p*
Reduction in # of past month binges	1.78 (4.20)	1.17 (4.70)	-.59	.56
Reduction in past month peak consumption	2.20 (4.37)	.98 (4.35)	-1.29	.20
Reduction in past month average consumption	1.32 (4.10)	.84 (5.35)	-.44	.66
Reduction in past month # of drinking days	1.97 (3.37)	1.17 (4.08)	-.99	.33

Table 11.

XI. No-affirmation condition: Within-subjects pre-test to 30-day follow-up changes in drinking behavior (Heavy Drinkers)

Drinking Behavior	Mean Change	t	p
Change in # of past month binges	-1.17 (4.70)	1.63	.11
Change in past month peak consumption	-0.98 (4.35)	1.34	.19
Change in past month average consumption	-0.84 (5.35)	1.28	.21
Change in past month # of drinking days	-1.17 (4.08)	.89	.38

Table 12.

XII. Values affirmation condition: Within-subjects pre-test to 30-day follow-up changes in drinking behavior (Heavy Drinkers)

Drinking Behavior	Mean Change	t	p
Change in # of past month binges	-2.10 (4.14)	2.73	.01
Change in past month peak consumption	-1.59 (3.97)	2.15	.04
Change in past month average consumption	-1.66 (4.50)	1.98	.06
Change in past month # of drinking days	-1.93 (3.25)	3.20	.003

Table 13.

XIII. Self-efficacy affirmation condition: Within-subjects pre-test to 30-day follow-up changes in drinking behavior (Heavy Drinkers)

| Drinking Behavior	Mean Change	t	p
Change in # of past month binges	-1.42 (4.26)	1.70	.10
Change in past month peak consumption	-2.89 (4.81)	3.06	.005
Change in past month average consumption	-0.94 (3.64)	1.32	.20
Change in past month # of drinking days	-2.02 (3.49)	2.95	.007

Table 14.

XIV. Mean change in drinking behavior from pre-test to 30-day follow-up (high-risk drinkers).

| | Affirmation Condition | | | | | |
	No-Affirmation	Values Affirmation	Self-efficacy Affirmation	F	p	η^2
# of past month binges	-2.21 (6.00)	-2.83 (6.12)	-1.57 (5.79)	.15	.87	.008
past month peak consumption	-1.76 (4.20)	-.33 (4.08)	-2.68 (4.77)	.94	.40	.045
past month average consumption	-1.56 (6.21)	.17 (4.49)	-1.25 (3.19)	.46	.63	.023
past month # of drinking days	-.76 (5.04)	-1.92 (3.52)	-2.25 (3.71)	.52	.60	.026

Figure 1.

I. Ratings of problem importance by affirmation condition among heavy drinkers. Error bars represent 95% confidence intervals.
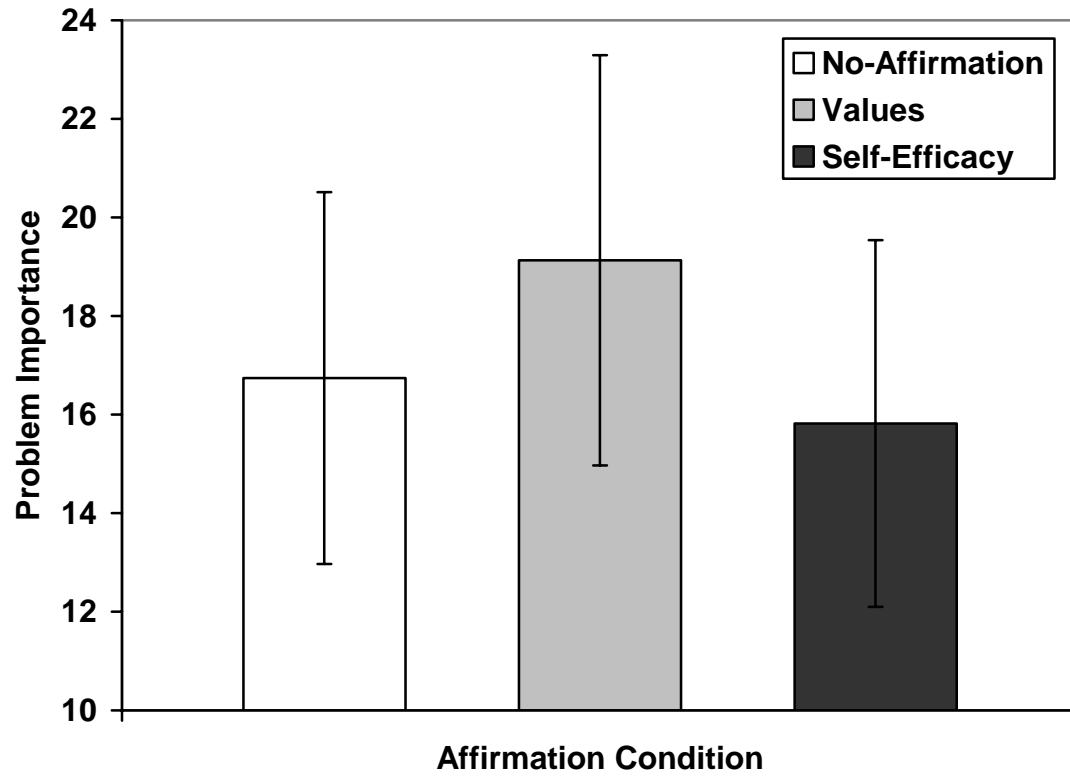
VITA

Christopher Neumann

Candidate for the Degree of

Doctor of Philosophy

Thesis: DEFENSIVE BIAS AND COLLEGE STUDENT DRINKING: DO SELF-AFFIRMATIONS INCREASE ACCEPTANCE TO THREATENING INFORMATION?

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This study was conducted to examine the effect a self-affirmation task would have on college student's drinking related attitudes and behavior. Three-hundred and one participants were randomized to one of three conditions: values-oriented affirmation task, self-efficacy oriented affirmation task, and no-affirmation condition. Participants were classified as non-drinkers, light drinkers, or heavy drinkers. After completing the affirmation task, participants read about the risks associated with college student drinking and were then asked about their drinking related attitudes.

Results generally did not support self-affirmation theory. After controlling for pre-experimental attitudes toward college alcohol use, all participants reported increased risk perceptions associated with college student drinking. In addition, participants who drank alcohol reported a reduction in drinking behavior at 30-day follow-up, regardless of affirmation condition. Lastly, self-esteem, hypothesized to play a role in self-affirmations, did not have an impact on the effectiveness of an affirmation task. Although significant between-group differences were not observed, within-group differences suggested that participants in the affirmation conditions reduced their drinking behavior to a greater extent than participants in the no-affirmation condition.

ADVISER'S APPROVAL: _____Thad R. Leffingwell_____