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EXAMINING THE HYPOCRISY PARADIGM AS AN INTERVENTION FOR MODIFYING  
HIGH-RISK ALCOHOL USE BEHAVIORS AMONG COLLEGE STUDENTS

by

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A dissertation submitted in partial fulfillment of the requirements  
for the degree of Doctor of Philosophy  
in the Department of Psychology  
in the College of Sciences  
at the University of Central Florida  
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## **ABSTRACT**

The purpose of this study was to examine the hypocrisy paradigm as an experimental alcohol intervention to determine if participants who complete the hypocrisy paradigm will experience a significant reduction in the number of negative consequences associated with their alcohol use, quantity and frequency of alcohol use, and average and peak eBAC compared to college students in the control condition. Participants were 53 college students randomly assigned to an experimental hypocrisy paradigm intervention or a control condition. Contrary to prediction, the hypocrisy paradigm was not found to be significantly different than the control condition. Exploratory analyses examining within-group differences were conducted. All outcome measures decreased from pre-intervention to follow-up within the hypocrisy paradigm condition. Future directions and implications are discussed.

I would like to dedicate this to my parents, Jim and Mary Hammons

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## **CHAPTER ONE: LITERATURE REVIEW**

Alcohol is the most common factor contributing to academic failure and perpetration of sexual misconduct among U.S. college students (Hingson, Heeren, Zakocs, Kopstein, & Wechsler, 2002). For example, over 1,400 U.S. college students die each year from alcohol-related unintentional injury (Hingson et al.), and about 11% of U.S. college student drinkers report that they have damaged property while under the influence of alcohol (Wechsler et al., 2002). Heavy episodic drinking, also known as binge drinking, increased 35% between 1995 and 2001 (Naimi et al., 2003) and has been found to have many serious health, social, and economic consequences (Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994; Wechsler, Kuo, Lee, & Dowdall, 2000). Binge drinking is also associated with assault and aggressive behavior (Wechsler, Dowdall, Davenport, & Castillo, 1995) and has been identified as the largest substance abuse problem in American universities (Syre & Martino-McAllister, 1997). College students who binge drink report poorer academic performance and miss more classes (Bennett, Miller, & Woodall, 1999). Research shows that college students are more likely to engage in heavy episodic alcohol use compared to their non-college attending peers (Hingson et al., 2002; Johnston, O'Malley, & Bachman, 2003; Slutske et al., 2004). As a result of college students' alcohol abuse and binge drinking behavior, in April 2002, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) issued "A Call to Action: Changing the Culture of Drinking at US Colleges"(2002). This initiative urges the research community to scientifically examine the causes and consequences of heavy episodic drinking among college students. The purpose of this study is to examine the effects of an intervention, called the hypocrisy-paradigm, on the drinking behaviors of college students who have been identified as high-risk consumers of alcohol.

Binge drinking is typically defined as drinking five or more drinks on one occasion (Syre & Martino-McAllister, 1997). However, various other definitions have been used by researchers in this area (Moore, Smith, & Catford, 1994; Nadeau, Guyon, & Bourgault, 1998). Nonetheless, the gender-specific definition of four or more drinks for women and five or more drinks for men is widely used (Wechsler, Dowdall, Davenport, & Rimm, 1995). Women who drink four drinks have the same likelihood of experiencing the negative consequences as men who drink five. However, the gender specific definition is highly sensitive but not very specific, potentially leading to a high number of false positives (Weingardt et al., 1998). In other words, the gender specific definition does not take into account the duration of time over which the drinks are consumed or the individual's body weight. For example, a 250lb. woman who consumed four drinks in a six-hour time period would not reach a "risky" blood alcohol content. However, using this definition, she would meet criteria for binge drinking. An important component missing in many studies of binge drinking is a specific time period. Many studies have defined time period as "in a row" (Wechsler et al, 1995; Wechsler & Kuo, 2000; Wechsler et al., 2000), in one "sitting" (Syre & Martino-McAllister, 1997), or by days of drinking (Naimi et al., 2003).

While traditional definitions of binge drinking use cut-off scores to separate binge drinking from non-binge drinking individuals (Syre & Martino-McAllister, 1997; Wechsler & Dowdall, 1998; Wechsler et al., 2002), it has been argued that this dichotomous separation does not portray the full picture of college drinking (Alexander & Bowen, 2004; Presley & Pimental, 2006). For example, it has been shown that many college students who meet the binge criteria of five drinks in a row for men and four drinks in a row for women do not reach legal levels of intoxication (Beirness, Foss, & Vogel-Sprott, 2004). College students who consume four or five drinks likely do so over an extended time. This allows time to metabolize the alcohol consumed

and prevents them from reaching potentially dangerous levels of intoxication. Blood alcohol concentration (BAC) is a preferable alternative to other binge definitions because it takes into account gender, body weight, and time frame (Beirness et al.).

Various forms of interventions aimed at reducing high-risk alcohol consumption among college students have been developed. Studies evaluating the effectiveness of these interventions have yielded mixed results, with some interventions showing more promise than others in curbing college students' proclivities for engaging in risky drinking behaviors. In this section, the interventions that have been developed and examined are reviewed.

Feedback-based alcohol interventions involve delivering personalized feedback regarding students' beliefs and behaviors related to alcohol use. Walters and Neighbors (2005) conducted a review of outcome studies using feedback as a component of alcohol intervention for college students. They found that 11 of the 13 reviewed studies reported a significant decrease in alcohol use (77%). Brief feedback-based interventions have been shown to be effective when delivered online or through the mail (Agostinelli, Brown, & Miller, 1995; Collins, Carey, & Sliwinski, 2002; Neighbors, Larimer, & Lewis, 2004), as well as in person (Borsari & Carey, 2000; Dimeff & McNeely, 2000; Neal & Carey, 2004). Typically, the in-person feedback-based interventions have incorporated techniques from motivational interviewing (Miller & Rollnick, 1991; 2002) with the aim of clarifying ambiguity, developing discrepancy, and increasing motivation for change. The Brief Alcohol Screening and Intervention for College Students (BASICS) approach (Dimeff, Baer, Kivlahan, & Marlatt, 1999) is a manualized feedback-based intervention that incorporates components from motivational interviewing and moderation training, such as monitoring drinking behavior and planning prior to drinking occasions (i.e., amount, time period). BASICS has been shown to decrease risky drinking behavior among college students

(Baer et al., 1992; Larimer et al., 2001; Marlatt et al., 1998; Murphy et al., 2004) and is listed as one of the Substance Abuse and Mental Health Services Administration (SAMHSA) model programs.

Expectancy challenge interventions, classified as a skills-based intervention by Larimer and Cronce (2007), are based on alcohol expectancy theory, which posits that beliefs about the effects of alcohol influence drinking behavior. Experiential expectancy challenge interventions attempt to modify beliefs about alcohol by developing discrepancy between the expected (or placebo) effects of alcohol (e.g., sociability) and the actual pharmacological effects of alcohol (e.g., dizziness) by administering alcohol beverages and placebo beverages (Darkes & Goldman, 1993). Students participating in the intervention are asked to identify individuals who received the alcohol beverage versus those who received the placebo beverage, and their errors in identification are used to facilitate a discussion about differentiating expectancy effects from actual pharmacological effects of alcohol. Previous studies have shown experiential expectancy challenge interventions to be effective at decreasing alcohol consumption in both male (Darkes & Goldman, 1993; 1998; Dunn, Lau, & Cruz, 2000) and female (Lau-Barraco & Dunn, 2008) college students.

Normative re-education interventions, also known as social norms interventions, involve providing students with information about the drinking behavior of their peers with the aim of changing their perception of “normal” drinking behavior. Previous research has shown that university students tend to believe that their peers hold more permissive beliefs about alcohol and drink more heavily than they actually do (Berkowitz & Perkins, 1986; Perkins, 1994). Borsari and Carey (2001) provide an extensive review of the role of perceived social norms on college students’ alcohol use. Normative re-education interventions are based on the premise that



students will reduce their alcohol consumption when their erroneous beliefs about their peers' alcohol consumption are challenged and corrected. Some research has shown normative re-education interventions to be effective at reducing alcohol consumption (Lewis & Neighbors, 2006; McNally & Palfai, 2003). However, research also indicates that normative re-education interventions do not lead to a decrease in negative consequences related to alcohol use and do not show maintenance at a 16-week follow-up (Walters, Vader, & Harris, 2007). Additionally, normative re-education interventions appear to be more effective when delivered individually compared to mass marketing or group interventions (Brown et al., 2007).

Information-based interventions involve providing students with information about the risks associated with alcohol consumption. Techniques involve providing students with pamphlets describing the risks associated with alcohol use and tips for protective behaviors aimed at reducing the risk associated with alcohol use. Research has shown no support for information-based interventions aimed at decreasing college students' alcohol use (Lysaught, Wodarski, & Parris, 2003; Neighbors, Spieker, Oster-Aaland, Lewis, & Bergstrom, 2005; Smith, Bogle, Talbott, Gant, & Castillo, 2006).

There are several interventions that have empirical support for college students engaging in heavy episodic alcohol use. Carey, Scott-Sheldon, Carey, and DeMartini (2007) conducted a meta-analytic review of studies evaluating individual-level interventions designed to reduce college students' alcohol use. Results of the meta-analysis suggest that individual interventions using motivational interviewing and personalized normative feedback were the most effective at reducing alcohol-related problems. Larimer and Cronce (2007) also completed a review of the literature focused on the prevention and treatment of college drinking. Their review found support for skills-based interventions and feedback-based motivational interventions, mixed

support for normative re-education interventions, and no support for information-based interventions.

While previous research has shown support for several interventions aimed at reducing high-risk alcohol consumption among college students, no previous research has examined the hypocrisy paradigm as a potential alcohol intervention. Additionally, there is a paucity of research examining the hypocrisy paradigm as an intervention for *any* substance use behavior. Because alcohol misuse is a prevalent problem among college-aged individuals, it is important to develop an empirically-supported, cost-effective prevention program to address the problem of heavy alcohol use by college students. In an effort to address the need for cost-effective empirically-supported alcohol interventions for college students, in this study, a modified version of the hypocrisy paradigm is examined. The hypocrisy paradigm is an experimental methodology used to arouse dissonance (Aronson, Fried, & Stone, 1991; Dickerson, Thibodeau, Aronson, & Miller, 1992; Fried & Aronson, 1995; Stone, Aronson, Crain, Winslow, & Fried, 1994) and is undergirded by different theories, particularly cognitive dissonance theory, social role theory, and self-presentation strategies. In the following section, the theories underlying the hypocrisy paradigm, the hypocrisy paradigm itself, and role modeling theory, are reviewed in order to provide a theoretical framework for the paradigm on which this study is based.

### Cognitive Dissonance Theory

Festinger's (1957) original theory of cognitive dissonance posits that elements of knowledge, also known as cognitions, can either be relevant or irrelevant to each other and that relevant cognitions can either be consonant or dissonant with each other. He defines cognitions as "any knowledge, opinion, or belief about the environment, about oneself, or about one's

behavior” (Festinger, p. 3). Cognitive discrepancy occurs when two or more relevant cognitions are experienced as logically inconsistent with each other. The inconsistency is theorized to elicit feelings of anxiety and discomfort, termed dissonance, and the individual experiencing the dissonance theoretically is motivated to take action to reduce these uncomfortable feelings.

According to Festinger (1957), the psychological distress can be reduced by either adding new consonant cognitions, removing dissonant cognitions, changing a behavioral cognitive element, or reducing the importance of dissonant cognitions. Festinger provides an example of a cigarette smoker who continues to smoke despite the knowledge that smoking is bad for her health. While this individual has the cognition that smoking cigarettes is bad for one’s health, she may also hold the following cognitions: a) that she enjoys smoking so much that it is worth it; b) the chances of her health suffering is not as serious as some would claim; c) she can’t avoid all dangerous situations while still living a normal life; and d) if she stopped smoking, she may gain weight, which is equally as bad for one’s health. So, while she holds the dissonant cognition that cigarette smoking is bad for her health, she holds several consonant relevant cognitions that are consistent with her continued cigarette use. The number or importance of the dissonant cognitions (i.e., smoking is bad for one’s health) determines the magnitude of the dissonance, or discomfort, experienced by the individual, also known as the dissonance ratio.

Since the introduction of the concept of cognitive dissonance in 1957 by Festinger, several researchers have modified and expanded this theory (Aronson, 1968; Brehm & Cohen, 1962; Bem, 1967; Wicklund & Brehm, 1976; Cooper and Fazio, 1984; Steele, 1999). Aronson expanded on Festinger’s theory of cognitive dissonance by incorporating the importance of self-concept (i.e.; one’s understanding and knowledge of oneself). Aronson (1968) posited that the strongest predictions of dissonance theory are made when important elements of the self-concept

are threatened, which would produce psychological discomfort. This typically occurs when individuals engage in behaviors that are inconsistent with their sense of self (Aronson & Carlsmith, 1962). Therefore, dissonance is experienced in situations where behavior is contrary to self-concept and elicits negative feelings, such as stupidity, hypocrisy, immorality, or confusion (Aronson, Chase, Helmreich, & Ruhnke, 1974). Using this self-consistency revision, the classic experiment by Festinger and Carlsmith (1959), in which participants deceived a confederate by telling him that a boring task was enjoyable, would be reinterpreted as an effect of dissonance produced by inconsistency between individuals' belief that they are a moral individual and the knowledge of their recent deceptive behavior. This dissonance produces "self persuasion", which has been shown to be a strong and relatively permanent form of persuasion leading to behavior change (Aronson, 1980). Additionally, Aronson suggested that people work to maintain a self-concept that is positive and consistent (1968).

Research by Steele and Liu (1983) support Aronson's theory that cognitive dissonance processes are rooted in the ego, or sense of self. Steele and Liu agree with Aronson that it is not the inconsistency itself that motivates change, but is the threat to the self or ego. This differs from Festinger's original theory which posited that the inconsistency itself motivates the change. Steele and Liu propose that self-affirmation theory would better explain the classic experiment by Festinger and Carlsmith (1959) as resulting from threat to the participants' feelings of self-worth, such as when they would say a task was enjoyable when they knew it was boring. Steele and Liu also demonstrate that dissonance processes are not influenced by a need for consistency. They found that self-affirmation, even when unrelated to the dissonance-producing act, reduces dissonance. In other words, an individual can reduce dissonance by self-affirmation even when the affirmation does not resolve the inconsistency caused by the dissonant act. This implies that

dissonance-reduction is rooted in a need for positive self-concept rather than cognitive consistency.

Dissonance is conceptualized as a motivational state, or an unpleasant state which includes both physiological discomfort and psychological arousal. Some researchers have argued that the drive-state is primarily physiological in nature, similar to the state of hunger or thirst (Croyle & Cooper, 1983; Fazio & Cooper, 1983; Elkin & Leippe, 1986; Palak & Pittman, 1972). Other researchers have argued that it is primarily psychological in nature, or an affective state of discomfort (Higgins, Rhodewalt, Zanna, 1979; Elliot & Devine, 1994). Elliot and Devine found that counter-attitudinal behavior produced psychological discomfort. This psychological discomfort motivated individuals to introduce strategies to reduce the aversive state of dissonance. Saunders and Wilkinson (1990) have referred to this state as the “psychological squirm” that motivates behavior change.

Researchers have expanded the concept of cognitive dissonance to apply to alcohol use behaviors. One of the most influential approaches incorporating the concept of cognitive dissonance is Miller and Rollnick’s (1991, 2002) motivational interviewing. Motivational interviewing involves the use of a technique called discrepancy enhancement, in which an interviewer uses open-ended questioning to develop a sense of personal discrepancy between one’s actual and ideal alcohol use patterns. When this discrepancy is emphatically brought into one’s immediate awareness, the dissonance creates a catalyst for behavioral change. Draycott and Dabbs (1998) posit that motivational interviewing is effective because people attempt to reduce their dissonant psychological state by changing their behavior to be more consistent with their self-concept. In other words, they reduce their alcohol consumption to match their self-

concept as a responsible alcohol consumer. This is consistent with Aronson's theory that dissonance occurs when one's self-concept is threatened (1980).

### Hypocrisy Paradigm: An Extension of Cognitive Dissonance Theory

The hypocrisy paradigm is an experimental methodology that was introduced by self-consistency theorists, and it involves developing cognitive discrepancy between a professed attitude and previous behaviors in an effort to arouse dissonance (Aronson et al., 1991; Dickerson et al., 1992; Fried & Aronson, 1995; Stone et al., 1994). Aronson's (1968) self-consistency revision to the theory of cognitive dissonance posits that dissonance arises when one's self-concept is threatened. One method of threatening one's self-concept is through feelings of hypocrisy, which arise from a realization that individuals are not "practicing what they preach." As previously discussed, cognitive discrepancy produces self persuasion in the form of dissonance, which has been shown to lead to changes in behavior. Researchers have found that inducing hypocrisy in an experimental setting leads to relatively long-term behavioral change in participants (Aronson et al., 1991; Fried & Aronson; Stone et al., 1994). In such studies, hypocrisy has been defined as a combination of advocating an attitude that one endorses and being made aware of times in the past when one has chosen behavior contrary to that attitude (Fried & Aronson). The hypocrisy paradigm has been applied to myriad societal problems such as condom use, water conservation, and recycling. To clarify the methodology behind the hypocrisy paradigm, I will review Aronson's experiment involving condom usage (Aronson et al., 1991).

Aronson, Fried and Stone (1991) used a 2 x 2 factorial design to study the impact of dissonance on modifying future behavior on college students. When first entering the lab, all

participants were told that they would be helping to develop an AIDS prevention program that would be shown to high-school students. Half of the participants were asked to describe in detail situations in the past when they failed to use condoms (forming the high mindful group). The other half did not participate in this step (forming the low mindful group). In the first condition, half of the high mindful and half of the low mindful participants were told they were part of a project for which a videotape about the importance of using condoms was being developed for high school students as part of a AIDS prevention program. Their task was to develop a speech to perform in front of a video camera while urging the targeted audience to use a condom if engaging in sexual activity with a partner. In the second condition, half of the high mindful and half of the low mindful participants were given the same instructions as participants in the first condition. However when it was time to deliver their speech, they were told that due to time constraints they were not going to be videotaped. Students in the hypocrisy condition (high mindful + video tape) reported higher rates of condom use at a three month follow-up compared to the other groups. A follow-up experiment using similar methodology introduced a behavioral measure of condom use rather than relying on self-report (Stone et al., 1994). Following each of the conditions, participants were presented with the opportunity to purchase condoms at a discounted rate. Among the participants in the hypocrisy condition, 83% purchased condoms, which was significantly greater than the other conditions (commitment-only condition 33%, mindful-only condition 50%, and AIDS info-only condition 44%). The percentages of condom purchases between these last three conditions were not significantly different.

Fried and Aronson (1995) used a similar design to examine the importance of arousal attribution in the hypocrisy paradigm. Participants wrote and delivered video-taped pro-recycling speeches and were told the speeches would be shown to other university students as part of a

recycling campaign. Half of the participants were asked to list times in the past that they failed to recycle. The other half simply gave the speech without inducing hypocrisy. Additionally, half of the participants in each condition were given an opportunity to misattribute their arousal to environmental conditions (i.e., room lighting, temperature, noise level). Participants were offered the opportunity to volunteer at a local recycling center. Dissonance was defined and measured by the length of time participants volunteered at the recycling center. Results showed that participants in the hypocrisy condition, in which they were not given an opportunity to misattribute their arousal to environmental conditions, volunteered more often and for longer time periods than participants in the other conditions. Participants in the hypocrisy condition who were given the opportunity to misattribute their arousal to the environmental conditions showed similar volunteer behavior compared to participants who did not have hypocrisy induced, suggesting that the effects of hypocrisy-induced dissonance was more influential on changing behavior than the effects of attributions for arousal.

Simmons, Webb, and Brandon (2004) applied the hypocrisy paradigm to tobacco use behaviors. The researchers incorporated attribution into their research design by allowing participants to attribute their smoking to an addiction beyond voluntary control. They had four groups of tobacco users who all delivered video-taped speeches about either the health risk of tobacco use, the feasibility of quitting tobacco use, or both the health risk and feasibility of quitting. They were told the speeches were going to be used in an anti-smoking campaign for adolescents. The first group received no information about the health risks of smoking or the ease of quitting (forming the control group). The second group received information about the health risks (forming the smoking-risk condition), the third received information that smoking cessation is attainable (forming the feasibility condition), and the fourth received both



information about the health risks and information that smoking cessation is attainable (forming the combined condition). Results found that providing information on the health risks of smoking or the feasibility of quitting increased participants' reported intentions to quit compared to the control condition. Results also indicated that the effects of the two manipulations combined did not have an additive effect above each one separately (i.e., combined condition). This behavioral intervention suggests that providing smokers with information that quitting is feasible or giving them information on the health risks of smoking successfully increases participants' reported intentions to quit smoking. A follow-up study by Simmons and Brandon (2007) found that an experimental smoking intervention aimed at inducing cognitive dissonance was effective at increasing motivation to quit smoking cigarettes and higher rates of cessation among female participants compared to a health-related intervention focusing on the importance of proper diet and nutrition. These studies suggest the use of the hypocrisy paradigm in inducing cognitive dissonance related to substance use behaviors may lead to changes in beliefs and behaviors related to future substance use.

#### An Alternative Explanation to Dissonance: Social Role Theory and Self Presentation Strategies

Social role theory posits that people function within social roles, which are guided by the expectations of others in society (Biddle, 1986). These roles include rights, duties, expectations, and standards for behavior (Linton, 1945). People's social role influences their given behavior in a situation. For example, a woman may exhibit different behavior in her role as a professional compared to her role as a mother. If individuals do not conform to their role, they run the risk of punishment by society, often in the form of social rejection. There are two forms of role conformity: instrumental and internalized. Instrumental conformity occurs when people

behaviorally conform to social norms because they realize that people in power may punish them for nonconformity (Fishbein & Ajzen, 1975). They do not necessarily experience attitudinal change and may behave in a manner contrary to their internal attitude or belief. Internalized conformity occurs when people accept the expectations of others as their own standards for behavior and change their internal attitudes or beliefs to correspond with their behavior. A norm may be considered internalized when it is not viewed objectively, or is not perceived as a rule by the individual, and is automatically expressed via the individual's behavior (Davis, 1949).

The classic Stanford Prison experiment provides a clear example of social role theory (Haney, Banks, & Zimbardo, 1973). Twenty-one men participated in a simulated prison experiment and were randomly assigned to the role of prisoner or prison guard. The guards were given no specific instructions about the details of their role and were free to conduct themselves as necessary to maintain order within the prison. Both the prisoners and guards quickly adapted to their roles. The guards became progressively abusive and humiliating, despite no evidence of aggressive tendencies demonstrated in a psychological assessment that was administered prior to the study. The prisoners displayed passivity, helplessness, and depression, again, despite no previous pathological indications from a psychological assessment that was administered prior to the study. The researchers theorized that the participants internalized the presumed social roles and began to engage in behaviors they believed to be consistent with the behaviors of guards and inmates. The experiment originally was designed to last two weeks, however it was terminated after eight days due to acute emotional disturbance exhibited by the prisoners and disturbing abusive behavior by the guards. This study demonstrates that, even when one is arbitrarily placed into a randomly selected role, role conformity can occur and internalized conformity may manifest itself.

Social role theory provides an alternative explanation for the effects produced in the hypocrisy paradigm experiments. It is possible that participants in the hypocrisy paradigms are being placed in the social role of “responsible citizen,” therefore they adhere to the expectations of that role due to either fear of repercussion or internalization of the expressed attitudes. It is possible that participants’ behavior change is not due to discrepancy between their advocated attitude and previous behavior resulting in dissonance-reducing behaviors. A methodological limitation of many of the earlier studies is the lack of empirical evidence demonstrating that self-concept influenced the effects on future behavioral changes (Brehm, 1992; Harmon-Jones, 2000).

Another alternative for explaining the outcomes of dissonance studies is based on the notion of self-presentation. Self presentation strategies are the processes through which individuals try to manage the impression others form about them. This is done by regulating or controlling information in a social interaction. Goffman (1959) was one of the first to write about self-presentation theory. He employed a “dramaturgical approach” in which social interactions are viewed as “performances” and individuals as “actors.” The process of constructing a social identity involves demonstrating the proper setting, appearance, and manner for the social role that is assumed by the actor. Baumeister and Tice (1984) note that it is important to distinguish between self-presentation strategies implemented to create a social representation that is consistent with one’s personal attitudes versus strategies to impress or please an audience. Strategies to please an audience will not likely lead to attitudinal change; however, self-presentation strategies that are implemented to create a social representation that is consistent with counter-attitudinal behavior are more likely to lead to cognitive dissonance (Baumeister, 1982).

It is noted here that similar to self-presentation strategies, impression management theory has been posited as an alternative explanation for cognitive dissonance theory and the hypocrisy paradigm. Impression management theory states that individuals strive to maintain a positive impression on others and may falsify their actual attitudes or behaviors in an effort to maintain a positive impression (Tedeschi, Schlenker, & Bonoma, 1971). Reported behavioral changes may be an attempt at creating or maintaining a favorable impression to the experimenter and may not accurately reflect real-life changes.

A copious body of research has examined the impact of role modeling, or mentoring, on mentees (Chao, Walz, & Gardner, 1992; Fagenson, 1989; Kram, 1985; Scandura, 1992; Whitely, Dougherty, & Dreher, 1991). Rosekrans (1967) demonstrated that imitative behavior in mentees increased when they perceived the role model to be similar to themselves, such as similar social background, age and personal interest. For example, a more recent study shows that Latina women prefer to be mentored by someone of their same ethnicity (Gonzalez-Figueroa & Young, 2005). Mentors have been identified as a key factor in the success of youth from high risk settings (Cowen & Work, 1988), and mentorship has been shown to positively correlate with career success and achievement (Ragins, 1997). Less research has been done examining the impact of mentoring on the *mentor*. Role models who have prior mentoring experience anticipate more positive outcomes from the mentoring relationship, such as personal fulfillment and satisfaction, compared to role models with no prior mentoring experience (Ragins & Scandura, 1999). Mentors have identified accelerated research productivity, social networking, and professional recognition as benefits reaped from the mentoring relationship (Ragins & Scandura, 1994; Russell & Adams, 1997). Additionally, intrinsic benefits such as increased career

satisfaction, a sense of generativity, and enhanced creative energy have been identified as positive outcomes for role models (Levinson, Darrow, Klein, Levinson, & McKee, 1978).

### Summary of Theories

All of the theories that have been reviewed are similar in that they all address methods aimed at maintaining self-consistency. Cognitive dissonance, a motivational state created by cognitive discrepancy resulting in feelings of dissonance, has been shown to lead to long-term behavioral change aimed at maintaining a self-concept that is positive and consistent. Techniques, such as the hypocrisy paradigm, induce dissonance in an experimental setting by making salient a discrepancy between one's advocated attitude and previous behaviors. Social role theory posits that individuals conform to societal expectations by engaging in various behaviors relative to the social role they are assuming at a given time in an effort to maintain consistency within their role. If individuals are forced into a social role, they may display behavior change to conform to the given role. This may involve the use of self-presentation strategies to construct a social identity that conforms to their role, however self-presentation strategies implemented to create internal consistency are more likely to lead to long-term behavioral change compared to strategies created to please an audience. Role modeling is linked to behavioral change in mentees as well as in mentors, although the mechanism driving the behavioral change is unclear. It is possible that through mentoring one is placed into a social role that becomes internalized thus leading to long-term behavioral change. It is also possible that discrepancy between attitudes and/or behaviors leads to dissonance, which results in dissonance-reducing techniques such as behavioral change.

Although these theories overlap conceptually, they also differ in important ways. Cognitive dissonance theory focuses on cognitive discrepancy leading to dissonance, which may result in dissonance-reducing techniques such as behavioral change. It does not address the concept of role conformity, but focuses on a personal desire to maintain a positive and consistent internal self-concept in order to decrease dissonance. Social role theory focuses on behavioral change that is motivated by external social expectations. Although the social role can become internalized resulting in personal attitude change, the initial motivating factor leading to behavioral change comes from an external source (i.e., society). Due to the paucity of research on the impact of role modeling on the mentee, it is unclear whether behavior change following the experience of role-modeling is related to an internal need to maintain personal consistency between beliefs and behavior or external forces placing pressure to conform to external societal expectations. Previous research suggests that both internal and external factors can influence long-term behavioral change (Aronson, 1980; Biddle, 1986; Haney et al., 1973; Simmons & Brandon, 2007; Steele & Liu, 1983).

### The Current Study

The link between heavy episodic alcohol use and numerous negative consequences among college students is well established (Hingson et al., 2002; Wechsler et al., 1994; Wechsler et al., 2000). While previous research has shown support for several interventions aimed at reducing high-risk alcohol consumption among college students, no previous research has examined the hypocrisy paradigm as a potential alcohol intervention. Furthermore, of the two previous studies examining the hypocrisy paradigm as an intervention for substance use behavior and intention to change, both studies were targeting tobacco use behaviors (Simmons et al.,

2004; Simmons & Brandon, 2007). This study represented an effort to address this void in the literature and was both timely and important. If the hypocrisy paradigm method of intervention were found to be effective for reducing alcohol consumption among college students, this would have important implications for alcohol intervention programming. Specifically, the hypocrisy paradigm approach was a low-cost, brief intervention that was relatively easy to administer. It also has important implications for college students and the university community as a whole. Reducing alcohol misuse among college students held the promise of reducing the number of negative consequences resulting from alcohol use.

The current study examined an experimental version of the hypocrisy paradigm in an effort to decrease negative consequences associated with alcohol use among college students. It was hypothesized that college students in the hypocrisy paradigm condition would experience a significant reduction in the number of negative consequences associated with their alcohol use compared to college students in the control condition. Additionally, it was hypothesized that college students in the hypocrisy paradigm condition would significantly reduce their average and peak estimated blood alcohol concentration (eBAC) compared to college students in the control condition. These hypotheses were based on previous literature suggesting that individuals placed in a role (i.e., role-model for high-school students) may conform to the perceived expectation of that role and choose behavior in accordance with the expectation (Biddle, 1986; Haney et al., 1973). Finally, it was hypothesized that college students in the hypocrisy paradigm condition would significantly reduce the quantity and frequency of their alcohol use compared to college students in the control conditions. These hypotheses were based on previous literature suggesting that the hypocrisy paradigm is effective at modifying future behaviors after discrepancy between previous behaviors and endorsed attitudes is made salient (Aronson et al.,

1991; Dickerson et al., 1992; Fried & Aronson, 1995; Stone et al., 1994; Simmons & Brandon, 2007).



## CHAPTER TWO: METHODOLOGY

### Participants

Participants were undergraduate college students who met the following inclusion criteria: 1) reported experiencing one or more negative consequences related to alcohol use as determined by a score of one or more on the Young Adult Alcohol Consequences Questionnaire (YAACQ) (Read, Kahler, Strong, & Colder, 2006); 2) self-identified as either Hispanic or non-Hispanic White (other ethnicities were excluded from the sample due to the low rates of alcohol misuse reported among college students of other ethnicities [Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998; Wechsler, Lee, Kuo, & Lee, 2000]); 3) reported engaging in a heavy drinking episode (i.e., 5 or more drinks in a sitting) during the past 6 weeks (Darkes & Goldman, 1993; 1998); and 4) expressed a belief that there is some risk associated with heavy episodic alcohol use as measured by the statement included at the end of the YAACQ (this is because the hypocrisy paradigm assumes participants hold the attitude that is targeted for change). Students who had a history of treatment for alcohol-related problems were not eligible for inclusion. Additionally, participants were screened to determine if they met criteria for alcohol dependence per DSM-IV-TR (2000) criteria, and no students met diagnostic criteria.

All students were recruited through the University of Central Florida undergraduate Psychology courses and participated in the initial screening for inclusion criteria (N = 2,705) through Sona Systems (the online psychology research participant pool). They signed an informed consent form as part of the questionnaire and received extra credit in their respective courses for participation in the initial screening. Students meeting inclusion criteria for participation in the study were invited to attend one intervention session (invited: N = 126;

attended: N = 108) and received additional extra credit after the researcher received their one month follow-up questionnaires. The CORE survey results indicate that 19% of UCF students meet criteria for heavy alcohol use (i.e., drank 5 or more drinks at a sitting over last two weeks one time or more). The majority of UCF students, 48%, were classified as non-heavy users indicating that they did not drink 5 or more drinks at a sitting over last two weeks (CORE Institute, 2006). Given that the majority of UCF students do not engage in heavy alcohol use, this may explain the relatively small number of participants who met inclusion criteria compared to the large number of participants who participated in the initial screening.

There were 40 participants lost to attrition, seven removed due to incomplete questionnaires at the intervention phase, and eight participants removed from the final analysis due to not returning their follow-up TLFB, leaving 22 participants in the control condition and 31 in the hypocrisy paradigm condition. Of the people who completed the entire follow-up assessment, 39 participants chose to complete it online, 14 participants chose to complete it over the telephone, and one participant chose to complete it through the mail.

The participants who chose to complete all three parts of the study and were included in the data analysis (N = 53) included 22 males (42%) and 31 females (59%). The participants ranged from 18 years old to 26 years old, with 79% of the participants under 21 years old (see Table 1). This is consistent with other research indicating that people under 21 years old are more likely to engage in heavy episodic alcohol use and are more likely to experience negative consequences as a result of their alcohol use (Presley, Meilman, & Lyerla, 1994). The participants self identified as White (N = 44) and Hispanic (N = 9), and the Hispanic participants self identified as Cuban (N = 3), Puerto Rican (N = 2), Central American (N = 1), South American (N = 2), and one did not specify their Hispanic subgroup membership. Regarding

participants' class standing, 49% identified as Freshmen, 19% as Sophomores, 17% as Juniors, and 15% as Seniors. The majority of participants reported never being married (96%) and having parents who attended college (81% father; 81% mother).

### Measures

#### *The Young Adult Alcohol Consequences Questionnaire (YAACQ).*

The YAACQ (Read, Kahler, Strong, & Colder, 2006) is a 48-item self report questionnaire designed to assess alcohol-related consequences experienced by college students. The YAACQ has eight subscales: 1) Social-Interpersonal Consequences; (2) Impaired Control; (3) Self-Perception; (4) Self-Care; (5) Risk Behaviors; (6) Academic/Occupational Consequences; (7) Physical Dependence consistent with the DSM-IV; and (8) Blackout Drinking. In addition to the subscale scores, the YAACQ yields a total score representing the number of times individuals have experienced an alcohol-related consequence in the stated time period. Each YAACQ item is a statement that the participant responds to as either “yes” or “no.” This measure takes approximately 15 minutes to complete and is scored by summing the number of items endorsed as “yes.” The raw scores range from 0 to 48, with problem severity increasing as the total sum value increases. The YAACQ demonstrated strong concurrent validity with the Young Adult Alcohol Problems Screening Test ( $r = .85$ ) and the Alcohol Use Disorders Identification Test ( $r = .76$ ), as well as predictive validity over repeated measures ( $\beta = .28$ ,  $sr^2 = .06$ ,  $p < .05$ ) (Read, Merrill, Kahler, & Strong, 2007). The YAACQ was administered at screening and at follow-up. Based on the present sample, the YAACQ was found to have a Cronbach alpha of .89 (at screening) and .93 (at follow-up).

*Attitude Towards Risks Associated with Heavy Episodic Alcohol Use.*

In order for the hypocrisy paradigm to effectively induce feelings of hypocrisy, the message of the speech (in this case that alcohol can be problematic) must be consistent with the attitude or belief held by the deliverer of the speech (Fried & Aronson, 1995). There are currently no published measures of attitudes regarding risks associated with heavy episodic alcohol use. Therefore, I developed a question aimed at assessing this attitude. In order to ensure that participants have an attitude consistent with the message they are developing and delivering in the hypocrisy paradigm, participants were asked to indicate their level of agreement with a statement placed at the end of the YAACQ. The statement is, “Misusing alcohol can have serious behavioral and health consequences.” Participants responded to the statement on a five-point Likert-type scale ranging from “strongly disagree” or “strongly agree.” Participants who endorsed that they “agree” or “strongly agree” with this statement were considered to have a consistent attitude with the message they delivered in the hypocrisy paradigm, and thus qualified for inclusion in the study. This measure was administered at screening.

*Timeline follow-back (TLFB).*

A timeline follow back procedure was used to gather information on alcohol consumption for the 30-days prior to data collection (Sobell & Sobell, 1992). Participants recorded their drinking on a 1-month calendar with self-identified reference points to facilitate memory. Such procedures have been found to minimize memory errors (Babor, Brown, & del Boca, 1990) and are considered reliable and valid methods of retrospectively obtaining customary drinking patterns (Babor, Stephens, & Marlatt, 1987; Sobell & Sobell, 1992). This calendar was modified

to include the time period in which the drinks were consumed in order to establish their BAC. Participants also recorded their gender and weight in order to calculate their BAC per drinking episode. This measure takes approximately 10 minutes to complete. The TLFB has Cronbach alpha coefficients ranging from .70 to 1.00 and has been shown to have satisfactory psychometric properties with a Spanish-speaking sample (Sobell, Sobell, Leo, & Cancilla, 1988; Sobell et al., 2001). The TFLB was administered at intervention and follow-up.

#### *Estimated Blood Alcohol Concentration.*

Previous research suggests the superiority of using estimated blood alcohol concentration scores compared to traditional cut-off scores on self-report measures when researching alcohol misuse among college students (Beirness et al., 2004). Estimated blood alcohol concentration scores were calculated for each day of reported drinking. Consistent with previous research (Hustad & Carey, 2005; Read, Beattie, & Chamberlain, 2008), the equation put forth by Matthews and Miller  $[(c/2)*(GC/w)] - (.02*t)$  was used to determine estimated blood alcohol concentration (1979). In this equation,  $c$  = total standard drinks consumed,  $GC$  = gender constant (9.0 for women, 7.5 for men),  $w$  = weight in pounds, and  $t$  = total hours spent drinking (Matthews & Miller, 1979). The Matthews and Miller equation has been found to have the highest correlation ( $r = .45$ ) with actual breath alcohol concentrations collected in vivo (Hustad & Carey).

*Stages of Change Readiness and Treatment Eagerness Scale, version 8 -- Alcohol (SOCRATES).*

The SOCRATES (Miller & Tonigan, 1996) is 19-item scale designed to assess readiness for change in alcohol abusers. This measure was included to determine if the experimental conditions are effective at moving participants towards the Action stage of change (Prochaska & DiClemente, 1992). Each SOCRATES item is a statement that the participant responds to on a 5 point Likert-type scale ranging from “strongly disagree” to “strongly agree.” The instrument yields three factorially-derived scale scores: Recognition (Re), Ambivalence (Am), and Taking Steps (Ts). The SOCRATES is available in pencil-and-paper self-administered format and can be administered in approximately 3 minutes. Based on the present sample, the SOCRATES was found to have Cronbach alphas at screening and follow-up for Ambivalence (.80 and .77), Recognition (.91 and .85), and Taking Steps (.92 and .91).

*Marlowe-Crowne Social Desirability Scale – Short Form (M-C SDS).*

The M-C SDS is a 13-item abbreviated version of the Marlowe-Crowne Social Desirability Scale (Reynolds, 1982). Each M-C SDS item is a statement that the participant responds to as either “true” to “false.” The scale is designed to measure attempts by participants to be perceived in a positive manner. The M-C SDS shows convergent validity with the original Marlowe-Crowne Social Desirability Scale (Reynolds, 1982; Zook & Sipps, 1985). Based on the present sample, the MCSDS was found to have a Cronbach alpha of .68.

### *Dissonance Thermometer.*

The dissonance thermometer is a 14-item measure of affective discomfort associated with cognitive dissonance (Elliot & Devine, 1994; Devine, Tauer, Barron, Elliot, & Vance, 1999). There are four scales associated with this measure including 1) Discomfort; 2) Negative Self; 3) Positive; and 4) Embarrass. Prior research has demonstrated that the Discomfort scale corresponds with discomfort experienced by inducing dissonance through the hypocrisy paradigm (Elliot & Devine; Simmons, Webb, & Brandon, 2004). Participants responded to words describing their current affect state on a 7-point Likert-type scale ranging from “does not apply at all” to “applies very much.” Based on the present sample, the dissonance thermometer has Cronbach alphas that range from .85 for the Discomfort scale, .91 for the Positive scale, .86 for the Negative Self scale, and .74 for the Embarrass scale.

### *Demographic questionnaire.*

A demographics questionnaire was included in the questionnaire packet and contained questions regarding the participant’s gender, age, ethnicity, current educational status, parents’ educational attainment, marital status, and employment status.

### Procedure

Participants enrolled in University of Central Florida undergraduate General Psychology courses completed an initial screening questionnaire to determine eligibility for participation and placement within the experimental groups. This initial screening consisted of the informed

consent form, the YAACQ, a measure of heavy episodic alcohol use, and the measure of attitude towards risks associated with heavy episodic alcohol use. Students meeting criteria for participation in the study, as described in the Participants section, were asked to attend one additional session. Students were randomly assigned to either the hypocrisy paradigm condition or the info-only control condition. After completing the intervention, participants completed the demographics questionnaire, the TLFB, the MC-SDS, the Dissonance Thermometer, and the SOCRATES. Before leaving, participants were told that they will be contacted to complete a one-month follow-up survey. They were asked for contact information consisting of their e-mail address, telephone number, street address, and permanent address. Participants were also asked to give the name and phone number of one other contact person in the event that their current contact information changes by the time of follow-up. They were told that all contact information would be kept confidential and were asked to sign a form giving permission for future correspondence. Participants received a one-month follow-up e-mail assessment containing the TLFB, YAACQ, and the SOCRATES. If a participant was unable to be contacted through e-mail, researchers contacted the participant by the other means listed in order to request their completion of the study assessments.

### Conditions

#### *Hypocrisy Paradigm Condition.*

Participants in the hypocrisy paradigm experimental condition were first told that they would be helping to develop an alcohol education program for high school students. In an effort to control for participants attributing discomfort to being “forced” to participate in the intervention, the voluntary nature of their participation was emphasized before beginning the



intervention (Wenzlaff & LePage, 2000). Participants were asked, “Would you like to participate?” and received an informed consent form emphasizing in bold letters that participation is voluntary and can be stopped at any time without penalty. Participants were asked to prepare and deliver a speech in front of a video camera stating their name and a message of personally responsible alcohol use. They were asked to identify three protective strategies commonly used to reduce the risk of negative consequences related to alcohol use that they have used in the past year (i.e., spacing drinks apart, alternating alcohol with non-alcoholic beverages). Their speech included these specific strategies they personally report using to reduce the risk of negative consequences associated with consuming alcohol. After delivering their speech in front of the camera, participants were asked to write down in detail instances in the past year when they consumed alcohol in a risky manner. They were told that this information would be used to identify common situations in which students use alcohol in a risky manner in order to make the alcohol education campaign relatable to the high school students. Fried (1998) found that when past failures to engage in the advocated behavior were reported publicly instead of privately, participants changed their professed attitudes, not their future behavior. In order to control for this effect, participants were told that this information would be kept completely anonymous and that no identifying information would be present on their papers. They placed their papers detailing instances in the past year when they had consumed alcohol in a risky manner in an envelope containing other “dummy” forms in order to ensure the perception of complete anonymity.

*Information- Only Control Condition.*

Participants in the information-only control group completed a psychoeducational computer program (i.e., Alcohol101 Plus) focusing on the risk of heavy alcohol consumption (Century Council, 2003). This included information in the form of a “virtual party” about blood alcohol concentration (BAC), negative consequences associated with heavy alcohol consumption, and normative feedback about their personal drinking patterns. This program took approximately 45 minutes to complete, which was an equivalent time frame as the experimental intervention. Donohue, Allen, and Maurer (2004) compared the original version of the computer software, Alcohol101 (Century Council, 1998), to Cognitive Behavioral Therapy (CBT) and found that both interventions were equally effective at reducing the number of alcohol drinks consumed per drinking occasion. Larsen and Kozar (2005) found no changes in attitudes towards alcohol use before and one week after completing Alcohol 101. Barnett, Murphy, and Colby (2007) compared Alcohol101 to a brief motivational intervention (BMI) and found that participants who completed Alcohol101 increased their drinking quantity at one-year follow-up compared to participants who received a BMI. Sharmer (2001) compared Alcohol101 to a teacher-centered motivational speech and found no changes in self-reported alcohol use for either intervention. Lau-Barraco and Dunn (2008) compared Alcohol101 to a single-session expectancy challenge intervention and found the expectancy challenge intervention led to greater reductions in alcohol use. Most recently, Carey, Henson, Carey, and Maiston (2009) compared Alcohol101 Plus to a BMI and found superior efficacy for the BMI at a one-month follow-up. This is the only controlled study to date that has examined the behavioral outcomes of Alcohol101 Plus, the most recent version of the computer software. Alcohol101 and Alcohol101 Plus have not been

shown to be more effective at changing college students' alcohol use behaviors or attitudes about alcohol use compared to in-person interventions, thereby making it a useful control condition.

### Statistical Analyses

The results were analyzed using SPSS for Windows version 17.0 using an alpha level of .05 unless otherwise noted. The data were examined for violations of normality, homogeneity of variance, and outliers. The methodology reported by Thalheimer and Cook (2002) for calculating effects sizes from published research was used to determine the Cohen's *d* effect sizes in the relevant literature. These Cohen's *d* effect sizes were converted into *f* effect sizes and entered into G power to determine the required sample size. In Simmons et al. (2004), the effect size *f* was .25. When this effect size was entered into G Power with  $\alpha = .05$ , power = .80, 2 groups, and 2 repetitions, the total sample size was 34. In Fried and Aronson (1995), the effect size *f* was .40. When this effect size was entered into G Power with  $\alpha = .05$ , power = .80, 2 groups, and 2 repetitions, the total sample size was 16. In Stone et al. (1994), the effect size *f* was .48. When this effect size was entered into G Power with  $\alpha = .05$ , power = .80, 2 groups, and 2 repetitions, the total sample size is 38. Based on the relevant literature, a sample size of 60 was determined to provide adequate statistical power. To test the hypothesis, a series of mixed 2x2 between-within subjects analysis of variance (ANOVAs) were used to determine the impact of the intervention on negative consequences associated with alcohol use, estimated blood alcohol concentration, and quantity and frequency of alcohol use. The within-subjects variables are the differences from pre-intervention to follow-up in participants' reported negative consequences associated with alcohol use, estimated blood alcohol concentration, and quantity and frequency of alcohol use. Measures of quantity and frequency of alcohol use include average number of

drinks per drinking occasion, number of days drinking per month, number of days meeting “binge drinking” criteria, highest number of drinks per drinking occasion, average number of days drinking per week, and average number of drinks per week. The between-subjects variable is the experimental condition (i.e., hypocrisy paradigm vs. control).

## CHAPTER THREE: RESULTS

### Preliminary Analyses

A series of independent-samples t-tests (for continuous variables) and Chi-squared tests for independence (for categorical variables) were conducted to determine if groups differed significantly on demographic variables. A Chi-squared test for independence indicated no significant association between group and marital status,  $\chi^2(1, n = 53) = .06, p = .80, \phi = -.03$ ; group and religion,  $\chi^2(6, n = 53) = 7.39, p = .29, \phi = .38$ ; and group and class standing,  $\chi^2(3, n = 53) = 1.23, p = .75, \phi = .15$ . A Chi-squared test for independence (with Yates Continuity Correction) indicated no significant association between group and gender,  $\chi^2(1, n = 53) = .13, p = .72, \phi = -.09$ ; group and ethnicity,  $\chi^2(1, n = 53) = .03, p = .86, \phi = .08$ ; and group and current employment,  $\chi^2(1, n = 53) = .35, p = .56, \phi = -.12$ . An independent-samples t-test was conducted to compare age and parental education for each group. There was no significant difference in age found for the control condition ( $M = 19.23, SD = 1.90$ ) and the hypocrisy paradigm condition ( $M = 19.35, SD = 1.84$ );  $t(53) = -.25, p = .81, d = .06$  (two-tailed). Further, there was no significant difference in father's education found for the control condition ( $M = 16.73, SD = 3.98$ ) and the hypocrisy paradigm condition ( $M = 18.29, SD = 3.95$ );  $t(53) = -1.42, p = .16, d = .39$  (two-tailed) or mother's education for the control condition ( $M = 16.59, SD = 3.42$ ) and the hypocrisy paradigm condition ( $M = 16.45, SD = 3.40$ );  $t(53) = .15, p = .88, d = .04$  (two-tailed). No statistically significant differences were found, indicating that the experimental and control group were comparable on all demographic variables.

A series of independent-samples t-tests was conducted to determine if groups differed significantly on pre-intervention scores for negative consequences associated with alcohol use,

eBAC, and quantity and frequency of alcohol use. There was no significant difference in pre-intervention typical eBAC found for the control condition ( $M = .10$ ,  $SD = .08$ ) and the hypocrisy paradigm condition ( $M = .12$ ,  $SD = .06$ );  $t(51) = -1.03$ ,  $p = .31$ ,  $d = .28$  (two-tailed), pre-intervention peak eBAC for the control condition ( $M = .18$ ,  $SD = .13$ ) and the hypocrisy paradigm condition ( $M = .26$ ,  $SD = .16$ );  $t(51) = -1.86$ ,  $p = .07$ ,  $d = .69$  (two-tailed), or pre-intervention negative consequences associated with alcohol use found for the control condition ( $M = 11.00$ ,  $SD = 7.80$ ) and the hypocrisy paradigm condition ( $M = 13.97$ ,  $SD = 7.91$ );  $t(51) = -1.35$ ,  $p = .18$ ,  $d = .38$  (two-tailed).

For measures of frequency of alcohol use, there was no significant difference in pre-intervention number of days drinking per month found for the control condition ( $M = 6.50$ ,  $SD = 4.21$ ) and the hypocrisy paradigm condition ( $M = 7.42$ ,  $SD = 5.24$ );  $t(51) = -.68$ ,  $p = .50$ ,  $d = .19$  (two-tailed), average number of days drinking per week for the control condition ( $M = 6.25$ ,  $SD = 4.99$ ) and the hypocrisy paradigm condition ( $M = 8.77$ ,  $SD = 6.39$ );  $t(51) = -.68$ ,  $p = .50$ ,  $d = .44$  (two-tailed), or number of days meeting “binge drinking” criteria for the control condition ( $M = 3.18$ ,  $SD = 3.03$ ) and the hypocrisy paradigm condition ( $M = 5.19$ ,  $SD = 4.37$ );  $t(51) = -1.86$ ,  $p = .07$ ,  $d = .53$  (two-tailed).

For measures of quantity of alcohol use, there were no significant differences in pre-intervention average number of drinks per week found for the control condition ( $M = 6.24$ ,  $SD = 4.99$ ) and the hypocrisy paradigm condition ( $M = 8.77$ ,  $SD = 6.39$ );  $t(51) = -1.55$ ,  $p = .13$ ,  $d = .44$  (two-tailed). There was a significant difference in pre-intervention average number of drinks per drinking occasion found for the control condition ( $M = 4.89$ ,  $SD = 2.39$ ) and the hypocrisy paradigm condition ( $M = 6.48$ ,  $SD = 2.53$ );  $t(51) = -2.30$ ,  $p = .03$ ,  $d = .65$  (two-tailed), as well as for highest number of drinks per drinking occasion found for the control condition ( $M = 8.23$ ,  $SD$

= 4.01) and the hypocrisy paradigm condition ( $M = 12.42$ ,  $SD = 6.41$ );  $t(51) = -2.71$ ,  $p = .01$ ,  $d = .78$  (two-tailed).

The control condition and hypocrisy paradigm condition differed on pre-intervention scores for average number of drinks per drinking occasion and highest number of drinks per drinking occasion. This difference will be accounted for in all future analyses involving these two variables. On all other pre-intervention scores for quantity and frequency of alcohol use, negative consequences associated with alcohol use, and eBAC, the control condition and hypocrisy paradigm condition were found to be comparable.

An independent-samples t-test was conducted to determine if groups differed significantly on pre-intervention scores on the Marlowe-Crowne Social Desirability Scale (MC-SDS). There was no significant difference in scores for participants in the hypocrisy paradigm condition ( $M = 6.19$ ,  $SD = 2.93$ ) and participants in the control condition ( $M = 6.91$ ,  $SD = 2.71$ ),  $t(51) = .89$ ,  $p = .38$ ,  $d = .26$  (two-tailed).

### Hypothesis Testing

A series of mixed 2x2 between-within subjects ANOVAs were conducted to assess the impact of the experimental conditions (hypocrisy paradigm vs. control) on participants' negative consequences associated with alcohol use, estimated blood alcohol concentration, and quantity and frequency of alcohol use, across two time periods (pre-intervention and follow-up).

Participants' negative consequences associated with alcohol use were examined, and there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = .65$ ,  $p = .42$ , partial eta squared = .01. There was a significant main effect for time, Wilks' Lambda  $F(1, 51) = 12.91$ ,  $p = .001$ , partial eta squared = .20, with both interventions showing a reduction

in negative consequences associated with alcohol use across the two time periods (see Table 2). The main effect comparing the two types of interventions approached, but did not achieve, statistical significance,  $F(1, 51) = 3.90, p = .05$ , partial eta squared = .07, suggesting no difference in the effectiveness of the two interventions.

For typical estimated blood alcohol concentration (eBAC), there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = .07, p = .79$ , partial eta squared = .001. There was a significant main effect for time, Wilks' Lambda  $F(1, 51) = 10.82, p = .002$ , partial eta squared = .18, with both interventions showing a reduction in estimated blood alcohol concentration across the two time periods (see Table 2). The main effect comparing the two types of interventions was not significant,  $F(1, 51) = 1.25, p = .27$ , partial eta squared = .02, suggesting no difference in the effectiveness of the two interventions.

For peak eBAC, there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = 2.03, p = .16$ , partial eta squared = .04. There was a significant main effect for time, Wilks' Lambda  $F(1, 51) = 9.27, p = .004$ , partial eta squared = .15, with both interventions showing a reduction in estimated blood alcohol concentration across the two time periods (see Table 2). The main effect comparing the two types of interventions was not significant,  $F(1, 51) = 2.18, p = .15$ , partial eta squared = .04, suggesting no difference in the effectiveness of the two interventions.

Participants' reported average number of drinks per week was examined, and there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = .18, p = .67$ , partial eta squared = .01. There was a significant main effect for time, Wilks' Lambda  $F(1, 51) = 7.33, p = .01$ , partial eta squared = .13, with both interventions showing a reduction in



the average number of drinks per week across the two time periods (see Table 2). The main effect comparing the two types of interventions did not achieve statistical significance,  $F(1, 51) = 2.15, p = .15$ , partial eta squared = .04, suggesting no difference in the effectiveness of the two interventions on reducing the number of drinks per week.

Participants' reported number of days drinking per month was examined, and there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = .03, p = .87$ , partial eta squared = .01. There was a significant main effect for time, Wilks' Lambda  $F(1, 51) = 8.10, p = .01$ , partial eta squared = .14, with both interventions showing a reduction in the number of days drinking per month across the two time periods (see Table 2). The main effect comparing the two types of interventions did not achieve statistical significance,  $F(1, 51) = .51, p = .48$ , partial eta squared = .01, suggesting no difference in the effectiveness of the two interventions on the number of days drinking per month.

For frequency of days meeting "binge drinking" criteria (i.e., 5 or more drinks in a sitting), there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = 1.57, p = .22$ , partial eta squared = .03. There was a significant main effect for time, Wilks' Lambda  $F(1, 51) = 15.13, p = .00$ , partial eta squared = .23, with both interventions showing a reduction in the frequency of days meeting "binge drinking" criteria across the two time periods (see Table 2). The main effect comparing the two types of interventions approached, but did not achieve, statistical significance,  $F(1, 51) = 3.24, p = .07$ , partial eta squared = .06, suggesting no difference in the effectiveness of the two interventions on lowering the frequency of days meeting "binge drinking" criteria.

Participants' reported average number of days drinking per week were examined, and there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = .03, p = .87$ , partial eta squared = .01. There was a significant main effect for time, Wilks' Lambda  $F(1, 51) = 8.10, p = .01$ , partial eta squared = .14, with both interventions showing a reduction in the average number of days drinking per week across the two time periods (see Table 2). The main effect comparing the two types of interventions did not achieve statistical significance,  $F(1, 51) = .51, p = .48$ , partial eta squared = .01, suggesting no difference in the effectiveness of the two interventions on reducing the average number of days drinking per week.

Due to the pre-intervention differences in scores on average number of drinks per drinking occasion and highest number of drinks per drinking occasion for the control condition and hypocrisy paradigm condition, two one-way analyses of covariance (ANCOVAs) were conducted to compare the impact of the experimental conditions (hypocrisy paradigm vs. control) on average number of drinks per drinking occasion and highest number of drinks per drinking occasion. The independent variables (IVs) were the condition (hypocrisy paradigm and control), and the dependent variables (DVs) were the scores on the outcome variables measured at follow-up. Participants' pre-intervention scores on the outcome variables were used as the covariate in these analyses. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate.

After adjusting for pre-intervention scores on average number of drinks per drinking occasion, there was no significant difference between the two conditions on follow-up scores on average number of drinks per drinking occasion,  $F(1, 50) = .08, p = .78$ , partial eta squared =

.01, suggesting no difference in the effectiveness of the two interventions on reducing the average number of drinks per drinking occasion (see Table 3).

After adjusting for pre-intervention scores on highest number of drinks per drinking occasion, there was no significant difference between the two conditions on follow-up scores on average number of drinks per drinking occasion,  $F(1, 50) = .21, p = .65$ , partial eta squared = .01, suggesting no difference in the effectiveness of the two interventions on reducing the highest number of drinks per drinking occasion (see Table 3).

### Exploratory Analyses

Given the unexpected findings from the hypotheses testing, an exploratory examination of the hypotheses was conducted to gain additional information regarding the results of the hypotheses testing. The data was grouped by condition forming two data sets, the control condition and the hypocrisy paradigm condition. Each condition was examined separately to explore within group changes from pre-intervention to follow-up on negative consequences associated with alcohol use, eBAC, and quantity and frequency of alcohol use.

Within the hypocrisy paradigm, a series of paired-samples t-tests were conducted to evaluate the impact of the intervention on participants' scores for negative consequences associated with alcohol use, eBAC, and quantity and frequency of alcohol use. There was a significant decrease in typical eBAC from pre-intervention ( $M = .12, SD = .06$ ) to follow-up ( $M = .09, SD = .06$ );  $t(30) = 3.16, p = .004, d = .50$  (two-tailed), peak eBAC from pre-intervention ( $M = .26, SD = .16$ ) to follow-up ( $M = .17, SD = .12$ );  $t(30) = 3.92, p = .00, d = .64$  (two-tailed), and negative consequences associated with alcohol use from pre-intervention ( $M = 13.97, SD = 7.91$ ) to follow-up ( $M = 11.03, SD = 9.09$ );  $t(30) = 2.20, p = .04, d = .35$  (two-tailed).

For measures of frequency of alcohol use, there was a significant decrease in number of days drinking per month from pre-intervention ( $M = 7.42$ ,  $SD = 5.24$ ) to follow-up ( $M = 6.10$ ,  $SD = 4.14$ );  $t(30) = 2.10$ ,  $p = .04$ ,  $d = .28$  (two-tailed), average number of days drinking per week from pre-intervention ( $M = 1.48$ ,  $SD = 1.05$ ) to follow-up ( $M = 1.22$ ,  $SD = .83$ );  $t(30) = 2.10$ ,  $p = .04$ ,  $d = .27$  (two-tailed), and number of days meeting “binge drinking” criteria from pre-intervention ( $M = 5.19$ ,  $SD = 4.37$ ) to follow-up ( $M = 3.77$ ,  $SD = 3.07$ );  $t(30) = 3.47$ ,  $p = .002$ ,  $d = .38$  (two-tailed).

For measures of quantity of alcohol use, there was a significant decrease in average number of drinks per week from pre-intervention ( $M = 8.77$ ,  $SD = 6.39$ ) to follow-up ( $M = 7.17$ ,  $SD = 6.47$ );  $t(30) = 2.29$ ,  $p = .03$ ,  $d = .25$  (two-tailed), average number of drinks per drinking occasion from pre-intervention ( $M = 6.48$ ,  $SD = 2.53$ ) to follow-up ( $M = 5.07$ ,  $SD = 3.10$ );  $t(30) = 3.36$ ,  $p = .002$ ,  $d = .50$  (two-tailed), and highest number of drinks per drinking occasion from pre-intervention ( $M = 12.42$ ,  $SD = 6.41$ ) to follow-up ( $M = 8.45$ ,  $SD = 5.75$ );  $t(30) = 3.99$ ,  $p = .00$ ,  $d = .65$  (two-tailed).

These findings indicate that the hypocrisy paradigm led to significant decreases in negative consequences associated with alcohol use, eBAC, and quantity and frequency of alcohol use when pre-intervention scores were compared to follow-up scores (see Figure 1).

Within the control condition, a series of paired-samples t-tests were conducted to evaluate the impact of the computer program, Alcohol101 Plus, on participants' scores for negative consequences associated with alcohol use, eBAC, and quantity and frequency of alcohol use. There was not a significant decrease in typical eBAC from pre-intervention ( $M = .10$ ,  $SD = .08$ ) to follow-up ( $M = .07$ ,  $SD = .05$ );  $t(21) = 1.71$ ,  $p = .10$ ,  $d = .45$  (two-tailed) or peak eBAC

from pre-intervention ( $M = .18$ ,  $SD = .13$ ) to follow-up ( $M = .15$ ,  $SD = .13$ );  $t(21) = .93$ ,  $p = .36$ ,  $d = .23$  (two-tailed). There was a significant difference in negative consequences associated with alcohol use from pre-intervention ( $M = 11.00$ ,  $SD = 7.80$ ) to follow-up ( $M = 6.36$ ,  $SD = 5.88$ );  $t(21) = 2.81$ ,  $p = .01$ ,  $d = .67$  (two-tailed).

For measures of frequency of alcohol use, there was a significant decrease in number of days drinking per month from pre-intervention ( $M = 6.50$ ,  $SD = 4.22$ ) to follow-up ( $M = 5.32$ ,  $SD = 4.45$ );  $t(21) = 2.15$ ,  $p = .04$ ,  $d = .27$  (two-tailed), average number of days drinking per week from pre-intervention ( $M = 1.30$ ,  $SD = .84$ ) to follow-up ( $M = 1.06$ ,  $SD = .89$ );  $t(21) = 2.15$ ,  $p = .04$ ,  $d = .28$  (two-tailed), and number of days meeting “binge drinking” criteria from pre-intervention ( $M = 3.18$ ,  $SD = 3.03$ ) to follow-up ( $M = 2.45$ ,  $SD = 2.87$ );  $t(21) = 2.35$ ,  $p = .03$ ,  $d = .25$  (two-tailed).

For measures of quantity of alcohol use, there was not a significant decrease in average number of drinks per week from pre-intervention ( $M = 6.24$ ,  $SD = 5.00$ ) to follow-up ( $M = 5.07$ ,  $SD = 5.39$ );  $t(21) = 1.65$ ,  $p = .12$ ,  $d = .23$  (two-tailed), average number of drinks per drinking occasion from pre-intervention ( $M = 4.89$ ,  $SD = 2.39$ ) to follow-up ( $M = 3.95$ ,  $SD = 2.58$ );  $t(21) = 1.40$ ,  $p = .18$ ,  $d = .38$  (two-tailed), and highest number of drinks per drinking occasion from pre-intervention ( $M = 8.23$ ,  $SD = 4.01$ ) to follow-up ( $M = 7.09$ ,  $SD = 6.14$ );  $t(21) = .82$ ,  $p = .42$ ,  $d = .22$  (two-tailed).

These findings indicate that control condition, Alcohol101 Plus, led to significant decreases in negative consequences associated with alcohol use and frequency of alcohol use when pre-intervention scores were compared to post-intervention scores. For eBAC and quantity

of alcohol use, there were no significant decreases between pre-intervention scores and follow-up scores (see Figure 2).

#### Possible Moderator Variables: Gender, Ethnicity, and Social Desirability

A series of 2x2 between groups analysis of covariance (ANCOVAs) were conducted to assess the impact of the experimental conditions (hypocrisy paradigm vs. control) on participants' negative consequences associated with alcohol use, eBAC, and quantity and frequency of alcohol use, for male and female participants to determine if gender is a moderator variable. The independent variables (IVs) were the condition (hypocrisy paradigm and control) and gender. The dependent variables (DVs) were the scores on the outcome variables administered at follow-up. Scores on the outcome variables administered pre-intervention were used as covariates to control for individual differences. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate.

After adjusting for negative consequences scores pre-intervention, there was no significant interaction effect for condition and gender,  $F(1, 48) = .13, p = .72$ , partial eta squared = .01. There was no significant main effect for condition ( $F[1, 48] = 2.29, p = .14$ , partial eta squared = .05) or gender ( $F[1, 48] = .06, p = .81$ , partial eta squared = .01). After adjusting for peak eBACs pre-intervention, there was no significant interaction effect for condition and gender,  $F(1, 48) = .07, p = .79$ , partial eta squared = .01. There was no significant main effect for condition ( $F[1, 48] = .11, p = .75$ , partial eta squared = .01) or gender ( $F[1, 48] = .02, p = .90$ , partial eta squared = .01). After adjusting for typical eBACs pre-intervention, there was no significant interaction effect for condition and gender,  $F(1, 48) = .31, p = .58$ , partial eta squared

= .01. There was no significant main effect for condition ( $F [1, 48] = .21, p = .65$ , partial eta squared = .01) or gender ( $F [1, 48] = .22, p = .64$ , partial eta squared = .01; see Table 4).

Next, a series of 2x2 between groups ANCOVAs were conducted on variables measuring the quantity of alcohol use. After adjusting for reported average number of drinks per drinking occasion pre-intervention, there was no significant interaction effect for condition and gender,  $F (1, 48) = .76, p = .39$ , partial eta squared = .02. There was no significant main effect for condition ( $F [1, 48] = .16, p = .69$ , partial eta squared = .01) or gender ( $F [1, 48] = 2.20, p = .15$ , partial eta squared = .04). After adjusting for reported highest number of drinks per drinking occasion pre-intervention, there was no significant interaction effect for condition and gender,  $F (1, 48) = .14, p = .71$ , partial eta squared = .01. There was no significant main effect for condition ( $F [1, 48] = .29, p = .60$ , partial eta squared = .01) or gender ( $F [1, 48] = .86, p = .36$ , partial eta squared = .02). After adjusting for reported average number of drinks per week pre-intervention, there was no significant interaction effect for condition and gender,  $F (1, 48) = 1.45, p = .26$ , partial eta squared = .03. There was no significant main effect for condition ( $F [1, 48] = .05, p = .82$ , partial eta squared = .01) or gender ( $F [1, 48] = .54, p = .47$ , partial eta squared = .01; see Table 4).

Last, a series of 2x2 between groups ANCOVAs were conducted on variables measuring the frequency of alcohol use. After adjusting for reported number of days meeting “binge drinking” criteria pre-intervention, there was no significant interaction effect for condition and gender,  $F (1, 48) = .25, p = .62$ , partial eta squared = .01. There was no significant main effect for condition ( $F [1, 48] = .03, p = .87$ , partial eta squared = .01) or gender ( $F [1, 48] = .01, p = .95$ , partial eta squared = .01). After adjusting for reported average number of days drinking per week pre-intervention, there was no significant interaction effect for condition and gender,  $F (1,$

48) = .26,  $p = .61$ , partial eta squared = .01. There was no significant main effect for condition ( $F [1, 48] = .14, p = .75$ , partial eta squared = .01) or gender ( $F [1, 48] = .10, p = .71$ , partial eta squared = .01). After adjusting for reported number of days drinking per month pre-intervention, there was no significant interaction effect for condition and gender,  $F (1, 48) = .26, p = .61$ , partial eta squared = .01. There was no significant main effect for condition ( $F [1, 48] = .10, p = .75$ , partial eta squared = .01) or gender ( $F [1, 48] = .14, p = .71$ , partial eta squared = .01; see Table 4).

These findings indicate that gender is not influencing the quantity and frequency of alcohol use, negative consequences associated with alcohol use, or eBAC in the two conditions. There were no significant interaction effects for any of the outcome variables, suggesting that males and females responded similarly to both of the conditions. Gender does not appear to be a moderator variable.

A series of 2x2 between groups ANCOVAs were conducted to assess the impact of the experimental conditions (hypocrisy paradigm vs. control) on participants' negative consequences associated with alcohol use, estimated blood alcohol concentration, and quantity and frequency of alcohol use, for Hispanic and non-Hispanic White participants to determine if ethnicity is a moderator variable. In light of the low number of Hispanic participants, these findings should be viewed with caution. The IVs were the condition (hypocrisy paradigm and control) and ethnicity. The DVs were the scores on the outcome variables administered at follow-up. Scores on the outcome variables administered pre-intervention were used as covariates to control for individual differences. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate.



After adjusting for negative consequences scores pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F(1, 48) = .34, p = .56$ , partial eta squared = .01. There was no significant main effect for condition ( $F[1, 48] = .58, p = .45$ , partial eta squared = .01) or ethnicity ( $F[1, 48] = .03, p = .88$ , partial eta squared = .01). After adjusting for peak eBACs pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F(1, 48) = .05, p = .83$ , partial eta squared = .01. There was no significant main effect for condition ( $F[1, 48] = .00, p = .98$ , partial eta squared = .00) or ethnicity ( $F[1, 48] = 3.02, p = .09$ , partial eta squared = .05). After adjusting for typical eBACs pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F(1, 48) = .24, p = .63$ , partial eta squared = .01. There was no significant main effect for condition ( $F[1, 48] = .57, p = .46$ , partial eta squared = .01) or ethnicity ( $F[1, 48] = 3.66, p = .06$ , partial eta squared = .07; see Table 5).

Next, a series of 2x2 between groups ANCOVAs were conducted on variables measuring the quantity of alcohol use. The IVs were the condition (hypocrisy paradigm and control) and ethnicity. The DVs were the scores on average number of drinks per drinking occasion, highest number of drinks per drinking occasion, average number of drinks per week, and number of days drinking per month administered at follow-up. After adjusting for reported average number of drinks per drinking occasion pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F(1, 48) = .26, p = .61$ , partial eta squared = .01. There was no significant main effect for condition ( $F[1, 48] = .39, p = .54$ , partial eta squared = .01) or ethnicity ( $F[1, 48] = 3.29, p = .08$ , partial eta squared = .06). After adjusting for reported highest number of drinks per drinking occasion pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F(1, 48) = .00, p = .99$ , partial eta squared = .00. There was no significant main effect for condition ( $F[1, 48] = .07, p = .79$ , partial eta squared = .01) or

ethnicity ( $F [1, 48] = 2.00, p = .16, \text{partial eta squared} = .04$ ). After adjusting for reported average number of drinks per week pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F (1, 48) = .27, p = .61, \text{partial eta squared} = .01$ . There was no significant main effect for condition ( $F [1, 48] = .24, p = .63 .05, \text{partial eta squared} = .01$ ) or ethnicity ( $F [1, 48] = 6.23, p = .06, \text{partial eta squared} = .12$ ; see Table 5).

Last, a series of 2x2 between groups ANCOVAs were conducted on variables measuring the frequency of alcohol use. The IVs were the condition (hypocrisy paradigm and control) and ethnicity. The DVs were the scores on reported number of days meeting “binge drinking” criteria, number of days drinking per month, and average number of days drinking per week administered at follow-up. After adjusting for reported number of days meeting “binge drinking” criteria pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F (1, 48) = .00, p = .98, \text{partial eta squared} = .00$ . There was no significant main effect for condition ( $F [1, 48] = .02, p = .89, \text{partial eta squared} = .00$ ) or ethnicity ( $F [1, 48] = 3.88, p = .06, \text{partial eta squared} = .08$ ). After adjusting for reported average number of days drinking per week pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F (1, 48) = .32, p = .57, \text{partial eta squared} = .01$ . There was no significant main effect for condition ( $F [1, 48] = .41, p = .53, \text{partial eta squared} = .01$ ) or ethnicity ( $F [1, 48] = 2.97, p = .09, \text{partial eta squared} = .06$ ). After adjusting for reported number of days drinking per month pre-intervention, there was no significant interaction effect for condition and ethnicity,  $F (1, 48) = .32, p = .57, \text{partial eta squared} = .01$ . There was no significant main effect for condition ( $F [1, 48] = .41, p = .53, \text{partial eta squared} = .01$ ) or ethnicity ( $F [1, 48] = 2.97, p = .09, \text{partial eta squared} = .06$ ; see Table 5).

These findings indicate that ethnicity is not influencing the quantity and frequency of alcohol use, negative consequences associated with alcohol use, or eBAC in the two conditions. There were no significant interaction effects for any of the outcome variables, suggesting that Hispanic and non-Hispanic White participants responded similarly to both of the conditions. Ethnicity does not appear to be a moderator variable.

A series of 2x2 between groups ANCOVAs were conducted to assess the impact of the experimental conditions (hypocrisy paradigm vs. control) on participants' negative consequences associated with alcohol use, estimated blood alcohol concentration, and quantity and frequency of alcohol use for responses on the MC-SDS to determine if responding to items in a socially desirable manner is a moderator variable. The independent variables (IVs) were the condition (hypocrisy paradigm and control) and MC-SDS scores, grouped categorically into low and high socially desirable responses. The dependent variables (DVs) were the scores on the outcome variables administered at follow-up. Scores on the outcome variables administered at intervention were used as covariates to control for individual differences. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate.

After adjusting for negative consequences scores pre-intervention, there was no significant interaction effect for condition and social desirability,  $F(1, 48) = 1.20, p = .28$ , partial eta squared = .02. There was no significant main effect for condition ( $F[1, 48] = 3.12, p = .08$ , partial eta squared = .06) or social desirability ( $F[1, 48] = .20, p = .66$ , partial eta squared = .01). After adjusting for typical eBAC pre-intervention, there was no significant interaction effect for condition and social desirability,  $F(1, 48) = .10, p = .76$ , partial eta squared = .00. There was no

significant main effect for condition ( $F [1, 48] = .22, p = .64$ , partial eta squared = .01) or social desirability ( $F [1, 48] = .24, p = .63$ , partial eta squared = .01). After adjusting for peak eBAC pre-intervention, there was no significant interaction effect for condition and social desirability,  $F (1, 48) = .01, p = .98$ , partial eta squared = .00. There was no significant main effect for condition ( $F [1, 48] = .07, p = .80$ , partial eta squared = .01) or social desirability ( $F [1, 48] = .83, p = .37$ , partial eta squared = .02; see Table 6).

Next, a series of 2x2 between groups ANCOVAs were conducted on variables measuring the quantity of alcohol use. The IVs were the condition (hypocrisy paradigm and control) and responding in a socially desirable manner. The DVs were the scores on average number of drinks per drinking occasion, highest number of drinks per drinking occasion, average number of drinks per week, and number of days drinking per month administered at follow-up. After adjusting for reported average number of drinks per drinking occasion pre-intervention, there was no significant interaction effect for condition and social desirability,  $F (1, 48) = .36, p = .55$ , partial eta squared = .01. There was no significant main effect for condition ( $F [1, 48] = .05, p = .84$ , partial eta squared = .00) or social desirability ( $F [1, 48] = .08, p = .78$ , partial eta squared = .00). After adjusting for reported highest number of drinks per drinking occasion pre-intervention, there was no significant interaction effect for condition and social desirability,  $F (1, 48) = .11, p = .75$ , partial eta squared = .00. There was no significant main effect for condition ( $F [1, 48] = .20, p = .66$ , partial eta squared = .01) or social desirability ( $F [1, 48] = .59, p = .45$ , partial eta squared = .01). After adjusting for reported average number of drinks per week pre-intervention, there was no significant interaction effect for condition and social desirability,  $F (1, 48) = 1.31, p = .26$ , partial eta squared = .03. There was no significant main effect for condition ( $F [1, 48] =$

.05,  $p = .83$ , partial eta squared = .00) or social desirability ( $F [1, 48] = .00$ ,  $p = .98$ , partial eta squared = .00; see Table 6).

Last, a series of 2x2 between groups ANCOVAs were conducted on variables measuring the frequency of alcohol use. The IVs were the condition (hypocrisy paradigm and control) and responding in a socially desirable manner. The DVs were the scores on reported number of days meeting “binge drinking” criteria, number of days drinking per month, and average number of days drinking per week administered at follow-up. After adjusting for reported number of days meeting “binge drinking” criteria pre-intervention, there was no significant interaction effect for condition and social desirability,  $F (1, 48) = .68$ ,  $p = .41$ , partial eta squared = .02. There was no significant main effect for condition ( $F [1, 48] = .01$ ,  $p = .95$ , partial eta squared = .00) or social desirability ( $F [1, 48] = .07$ ,  $p = .80$ , partial eta squared = .00). After adjusting for reported average number of days drinking per week pre-intervention, there was no significant interaction effect for condition and social desirability,  $F (1, 48) = .09$ ,  $p = .76$ , partial eta squared = .00. There was no significant main effect for condition ( $F [1, 48] = .02$ ,  $p = .89$ , partial eta squared = .00) or social desirability ( $F [1, 48] = .04$ ,  $p = .84$ , partial eta squared = .00). After adjusting for reported number of days drinking per month pre-intervention, there was no significant interaction effect for condition and social desirability,  $F (1, 48) = .10$ ,  $p = .76$ , partial eta squared = .00. There was no significant main effect for condition ( $F [1, 48] = .02$ ,  $p = .89$ , partial eta squared = .00) or social desirability ( $F [1, 48] = .04$ ,  $p = .84$ , partial eta squared = .00; see Table 6).

These findings indicate that responding in a socially desirable manner is not influencing the quantity and frequency of alcohol use, negative consequences associated with alcohol use, or eBAC in the two conditions. There were no significant interaction effects for any of the outcome

variables, suggesting that participants with low and high socially desirable responses responded similarly to both of the conditions. Responding in a socially desirable manner does not appear to be a moderator variable.

### Other Variables

Because the hypocrisy paradigm theoretically elicits cognitive dissonance, a measure of cognitive dissonance was included to determine whether participants in the hypocrisy paradigm condition differed in their reported level of cognitive dissonance following the intervention compared to participants in the control condition. An independent-samples t-test was conducted to compare the scores on the Discomfort scale of the Dissonance Thermometer for participants in each condition. There was no significant difference in scores for participants in the hypocrisy paradigm condition ( $M = 4.90$ ,  $SD = 2.20$ ) and participants in the control condition ( $M = 4.86$ ,  $SD = 2.12$ ),  $t(51) = -.07$ ,  $p = .95$ ,  $d = .02$  (two-tailed), suggesting that the hypocrisy paradigm was not superior at eliciting cognitive dissonance compared to the control group.

The SOCRATES was included to determine if the experimental condition was effective at moving participants towards the Action stage of change (Prochaska & DiClemente, 1992). A series of mixed 2x2 between-within subjects ANOVAs were conducted to assess the impact of the experimental conditions (hypocrisy paradigm vs. control) on participants' scores on the Recognition, Ambivalence, and Taking Steps scales of the SOCRATES, across two time periods (intervention and follow-up). For the Recognition scale, there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = 1.16$ ,  $p = .29$ , partial eta squared = .02. There was not a significant main effect for time, Wilks' Lambda  $F(1, 51) = .50$ ,  $p = .48$ , partial eta squared = .01, and the main effect comparing the two types of interventions did

not achieve statistical significance,  $F(1, 51) = 2.97, p = .09$ , partial eta squared = .06 (see Table 7). These findings suggest no difference in the effectiveness of the two interventions with respect to recognition of problems related to alcohol use.

Next, the Ambivalence scale was examined, and there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = .07, p = .80$ , partial eta squared = .01. There was not a significant main effect for time, Wilks' Lambda  $F(1, 51) = .07, p = .80$ , partial eta squared = .01, and the main effect comparing the two types of interventions did not achieve statistical significance,  $F(1, 51) = 1.88, p = .18$ , partial eta squared = .04 (see Table 7). These findings suggest no difference in the effectiveness of the two interventions with respect to ambivalence about alcohol use.

Last, the Taking Steps scale was examined, and there was no significant interaction found between intervention and time, Wilks' Lambda  $F(1, 51) = .91, p = .35$ , partial eta squared = .02. There was not a significant main effect for time, Wilks' Lambda  $F(1, 51) = .56, p = .46$ , partial eta squared = .01, and the main effect comparing the two types of interventions did not achieve statistical significance,  $F(1, 51) = .20, p = .66$ , partial eta squared = .01 (see Table 7). These findings suggest no difference in the effectiveness of the two interventions with respect to taking steps to make changes in alcohol use.

A series of 2x2 between groups ANCOVAs were conducted to assess the impact of the experimental conditions (hypocrisy paradigm vs. control) on participants' SOCRATES scores for responses on the MC-SDS to determine if responding in a socially desirable manner is a moderator variable. The independent variables (IVs) were the condition (hypocrisy paradigm and control) and MC-SDS scores, grouped categorically into low and high socially desirable

responses. The dependent variables (DVs) were the scores on the SOCRATES scales administered at follow-up. Scores on the SOCRATES scales administered at intervention were used as covariates to control for individual differences. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, homogeneity of variances, homogeneity of regression slopes, and reliable measurement of the covariate.

After adjusting for Recognition scores at intervention, there was no significant interaction effect for condition and social desirability,  $F(1, 48) = .22, p = .64$ , partial eta squared = .01. There was no significant main effect for social desirability ( $F[1, 48] = .68, p = .41$ , partial eta squared = .01) or condition ( $F[1, 48] = 4.27, p = .04$ , partial eta squared = .08). After adjusting for Ambivalence scores at intervention, there was no significant interaction effect for condition and social desirability,  $F(1, 48) = .33, p = .57$ , partial eta squared = .01. There was no significant main effect for social desirability ( $F[1, 48] = .21, p = .65$ , partial eta squared = .02) or condition ( $F[1, 48] = .98, p = .33$ , partial eta squared = .01). After adjusting for Taking Steps scores at intervention, there was no significant interaction effect for condition and social desirability,  $F(1, 48) = 1.51, p = .23$ , partial eta squared = .03. There was no significant main effect for social desirability ( $F[1, 48] = .19, p = .67$ , partial eta squared = .03) or condition ( $F[1, 48] = 1.56, p = .22$ , partial eta squared = .01).

These findings indicate that socially desirable responding was not influencing the SOCRATES scores in the two conditions. There were no significant interactions or main effects for any of the outcome variables, suggesting that socially desirable responding was similar in both of the conditions. Responding in a socially desirable manner does not appear to be a moderator variable.



## **CHAPTER FOUR: DISCUSSION**

It was hypothesized that college students in the hypocrisy paradigm condition would experience a significant reduction in the quantity and frequency of their alcohol use, number of negative consequences associated with their alcohol use, and average and peak eBACs compared to college students in the control condition. These expectations were based on previous literature suggesting that the hypocrisy paradigm is effective at modifying future behaviors after the discrepancy between previous behaviors and endorsed attitudes is made salient (Aronson et al, 1991; Dickerson et al., 1992; Fried & Aronson, 1995; Stone et al., 1994; Simmons & Brandon, 2007). The results indicated that the hypocrisy paradigm was no more effective than the control condition at reducing the quantity and frequency of alcohol use, number of negative consequences associated with alcohol use, and average and peak estimated eBACs. To further elucidate the findings, a series of exploratory analyses were conducted. When the conditions were examined separately for changes from pre-intervention to follow-up, the findings were mixed.

For measures of quantity and frequency of alcohol use, negative consequences associated with alcohol use, and eBAC, there were no significant differences between the hypocrisy paradigm and the control condition. For negative consequences associated with alcohol use and frequency of days meeting “binge drinking” criteria, the main effect for condition approached significance. These two trends towards significance indicate that the hypocrisy paradigm may lead to a greater decrease in negative consequences associated with alcohol use and frequency of days meeting “binge drinking” criteria compared to the control group. For the other outcome variables, the findings indicate that neither condition was superior to the other at decreasing post-intervention scores on measures of quantity and frequency of alcohol use and eBAC.

A possible explanation for this finding is that *both* the hypocrisy paradigm and the control condition significantly and equally decreased post-intervention scores on measures of quantity and frequency of alcohol use, negative consequences associated with alcohol use, and eBAC. This would explain the finding that there was no significant difference detected between the two conditions. This would mean that the control condition, Alcohol101 Plus, was an active control condition. Alcohol101 Plus was chosen as a control condition because previous research indicated that it was not more effective at modifying alcohol use behaviors or attitudes about alcohol use compared to in-person interventions. However, several of the previous studies of the effects of the original version of Alcohol101 found it to be as effective as the in-person interventions in reducing quantity and frequency of alcohol use (e.g., Donohue et al., 2004; Sharmer, 2001). In the only study that included negative consequences associated with alcohol use as an outcome variable for the original version of Alcohol101, there was no significant group difference in negative consequences associated with alcohol use between Alcohol101 and a brief motivational interview (Barnett et al, 2007). Carey et al. (2009) is the only study to date to examine the new version of the software, Alcohol 101 Plus. These researchers found no significant group differences comparing Alcohol101 Plus to a brief motivational interview on measures of negative consequences associated with alcohol use and quantity of alcohol use. Therefore, although there is no evidence to indicate that Alcohol101 Plus is *more* effective at reducing negative consequences associated with alcohol use or quantity/frequency of alcohol use compared to in-person interventions, there is some evidence to suggest that computer-delivered interventions, such as Alcohol101 Plus, may be *as* effective as in-person interventions at reducing outcomes associated with alcohol misuse (Carey et al., 2009). This would explain why there is no outcome difference between the hypocrisy paradigm and the control condition. Given

the paucity of research examining Alcohol101 Plus, it is possible that the new version of the software may be as effective as in-person interventions in reducing negative consequences associated with alcohol use, quantity and frequency of alcohol use, and eBAC among college students. Further research on Alcohol101 Plus is needed to clarify these findings.

For negative consequences associated with alcohol use, eBAC, number of days drinking per month, number of days meeting “binge drinking” criteria, average number of days drinking per week, and average number of drinks per week, there was a main effect found for time. This indicates that both interventions showed a significant reduction in the outcome measure across the two time periods. Thus, while the main effect for time indicates that there was a change in outcome scores from pre-intervention to follow-up, the lack of a significant between group effect, as well as the lack of a significant interaction effect, indicate that the change in scores was not different for the two groups. This finding lends further support to interpretation that Alcohol101 Plus was an active control group. Previous literature has demonstrated the effectiveness of the hypocrisy paradigm (Simmons et al., 2004) and Alcohol101/Alcohol101 Plus (Donohue et al., 2004; Carey et al., 2009) at reducing substance use and related negative outcomes, and it is possible that *both* the hypocrisy paradigm and the control condition led to significant decreases in outcome measures at follow-up.

### Exploratory Analyses

#### *Quantity and Frequency of Alcohol Use*

In an effort to possibly glean some insight into why there were no significant differences between the hypocrisy paradigm condition and the control condition, the data were grouped by

condition, forming two data sets, and each condition was examined separately to explore within group changes from pre-intervention to follow-up.

For the hypocrisy paradigm, there was a significant decrease in number of reported days drinking per month, average number of drinks per drinking occasion, number of days meeting “binge drinking” criteria, highest number of drinks per drinking occasion, average number of days drinking per week, and average number of drinks per week from pre-intervention to follow-up. This indicates that participants who completed the hypocrisy paradigm intervention significantly decreased on all measures of quantity and frequency of alcohol use at follow-up. Because there was not a no-intervention comparison group (i.e., a true control group), it is difficult to know with certainty if the change from pre-intervention to follow-up was the result of the hypocrisy paradigm intervention. Although the mechanism of change can not be readily identified given the current research design, there are two possible explanations for the quantity and frequency outcomes demonstrated in participants who completed the hypocrisy paradigm intervention.

The first possible explanation is that the hypocrisy paradigm intervention shares commonalities with other empirically supported alcohol interventions for college students. Specifically, interventions using motivational interviewing have been shown to be effective at reducing college students’ alcohol use (Carey et al., 2007). Motivational interviewing involves a technique called discrepancy enhancement, which uses open-ended questioning to develop a sense of personal discrepancy between one’s actual and ideal alcohol use patterns, to elicit cognitive dissonance (Miller & Rollnick, 1991; 2002). Theoretically, this leads to attempts at reducing the dissonant psychological state by changing current behaviors to be more consistent with one’s self-concept (Draycott & Dabbs, 1998). The hypocrisy paradigm also is designed to

elicit cognitive dissonance by having participants prepare and deliver a speech in front of a video camera stating their name and a message of personally responsible alcohol use. Participants are subsequently asked to write down in detail instances in the past year when they consumed alcohol in a risky manner, thus developing a sense of personal discrepancy between their actual and ideal alcohol use patterns. Given that motivational interviewing has been shown to reduce heavy episodic alcohol use among college students (Carey et al., 2007), it is possible that the current findings are the result of efforts to reduce cognitive dissonance. Participants may have reduced their alcohol use behaviors in an effort to establish consistency with their ideal alcohol use pattern.

The second possible explanation is that the hypocrisy paradigm shares commonalities with interventions using specific alcohol-focused skills training, which have been found to reduce heavy episodic alcohol use among college students (Larimer & Cronce, 2007). Some of the alcohol-focused skills training protocols include information on reducing alcohol-related harm (Borsari & Carey, 2005), and harm-reduction approaches have been found to be effective at reducing alcohol consumption among college students and adolescents (Carey et al., 2007; Larimer & Cronce, 2007; White, 2006). The hypocrisy paradigm involved an alcohol-focused skills training component, whereby participants were asked to identify three protective strategies they used to reduce the risk of negative consequences related to alcohol use in the past year (e.g., spacing drinks apart, alternating alcohol with non-alcoholic beverages, etc.). The participants discussed these strategies with the research assistant, wrote them down on a form, and were asked to include these specific strategies in their speech. Given that alcohol-focused skill training has been found to reduce heavy episodic alcohol use among college students, it is possible that

the current findings are related to the discussion and identification of protective strategies during the hypocrisy paradigm intervention that were generated by participants.

For the control condition, there also was a significant decrease in number of days drinking per month, average number of days drinking per week, and number of days meeting “binge drinking” criteria from pre-intervention to follow-up. This indicates that participants who completed the control condition significantly decreased on all measures of frequency of alcohol at follow-up. However, for measures of quantity of alcohol use there was not a significant decrease in average number of drinks per drinking occasion, highest number of drinks per drinking occasion, and average number of drinks per week. For the control condition, there was no change in measures of quantity of alcohol use at follow-up.

It appears that the control condition used in this study is not effective at significantly decreasing quantity of alcohol use, however most problems associated with college students’ alcohol use result from consuming large quantities of alcohol. A large component of the Alcohol101 Plus program focuses on information related to BAC and negative consequences associated with alcohol use. Previous research has shown no support for information-based interventions aimed at decreasing college students’ alcohol use (Lysaught et al., 2003; Neighbors et al., 2005; Smith et al., 2006). It appears that participants who completed the control condition may be drinking less often throughout the month following the intervention, yet still consume the same amount when they do drink. It is possible that this is the result of the large proportion of information-based content in the control intervention.

### *Negative Consequences Associated with Alcohol Use*

There was a significant decrease in scores for negative consequences associated with alcohol use for both the control condition and the hypocrisy paradigm condition. It appears that both the conditions were effective at reducing the number of negative consequences associated with alcohol. A possible explanation for this finding is the focus on protective behavioral strategies in both interventions. Protective behavioral strategies involve the use of behaviors implemented when consuming alcohol to limit to impact of negative consequences. Designating a driver, “pacing and spacing” drinks, eating before consuming alcohol, not consuming alcohol when using other substances, and alternating alcohol drinks with non-alcohol drinks are examples of protective behavioral strategies. Both the hypocrisy paradigm condition and the control condition incorporated protective behavioral strategies as part of the program. Previous research has shown that less frequent use of protective behavioral strategies is associated with experiencing a higher number of negative consequences associated with alcohol use (Araas & Adams, 2008; Martens, Taylor, Damann, Page, Mowry, & Cimini, 2004). It is possible that the focus on protective behavioral strategies in both conditions led to an increase in the use of these strategies during the month following the interventions, thus decreasing the number of negative consequences associated with alcohol use experienced by participants.

### *Estimated Blood Alcohol Concentration*

Last, for average and peak estimated blood alcohol concentration (eBAC) there was a significant decrease in scores for the hypocrisy paradigm condition. However, this same finding was not shown in the control condition. For the control condition, there was not a significant

decrease in average and peak eBACs from pre-intervention to follow-up. There are three possible explanations for this finding.

One possible explanation for this finding is that the hypocrisy paradigm shares commonalities with other empirically supported alcohol interventions for college students, such as motivational interviewing, that the control condition did not incorporate. As previously noted interventions using motivational interviewing techniques have been shown to reduce alcohol use in college students. Additionally, eBAC is a preferable alternative to measures of quantity and frequency because it takes into account gender, body weight, and time frame, making eBAC a more sensitive measure of alcohol use. Because it is more sensitive, it may detect differences not found in the prior analyses of quantity and frequency of alcohol use.

A second possible explanation for this finding is problems associated with the eBAC measurement and equation. eBAC does not control for individual differences such as differences in alcohol absorption, distribution, and metabolism. Carey and Hustad (2005) found that increases in the length of the drinking episode, greater number of drinks consumed on an occasion, higher body weight, and higher levels of education are associated with overestimations of actual BAC by the eBAC. Further, Read et al. (2008) acknowledge that eBACs are based on retrospective reporting of alcohol use and time period of alcohol use and are therefore susceptible to memory error. Although eBAC provides a more precise measure than traditional “cut-off” scores, it does include more variables that are based on retrospective self-report, which may introduce more error into the measurement. It is possible that the current findings are being influenced by individual differences not being accounted for in the eBAC measurement or by error introduced by the retrospective self-report. The field is in the early stages of the use of



eBAC in alcohol research, and further research is needed to determine the utility of this measurement.

A final possible explanation for this finding is that participants with higher eBACs at follow-up declined to participate in the follow-up questionnaire. In Beirness et al. (2004), 38% of the college students approached for BAC measurement declined to participate. Naimi and Brewer (2005) suggest that the 38% who declined likely had higher BACs than participants and declined participation because there are possible negative consequences associated with being identified as intoxicated. Although participants were informed about confidentiality during every phase of participation, it is possible that participants in the current study who had higher eBACs feared negative repercussion related to reporting high levels of alcohol use and therefore declined participation in the follow-up phase. Similar to Beirness et al., 37% of the participants in the current study were lost to attrition and did not participate in the follow-up phase.

#### Possible Moderator Variables: Gender, Ethnicity, Social Desirability

Gender was examined to determine if it influenced the quantity and frequency of alcohol use, negative consequences associated with alcohol use, or eBAC in the two conditions. I examined gender as a potential moderator variable based on previous research indicating that college females consume less alcohol and experience less negative consequences associated with alcohol use compared to college males (Greenfield, Midanik, & Rogers, 2000; Korcuska & Thombs, 2003). There were no significant interaction effects for any of the outcome variables, indicating that male and female participants responded similarly to both of the conditions.

Perhaps females who consume lower amounts of alcohol were not included in this sample. All participants were screened for inclusion criteria prior to participating in the

hypocrisy paradigm. In order to participate in the intervention phase of the study, participants had to report experiencing one or more negative consequences related to alcohol use in the past year and engaging in a heavy drinking episode (i.e., 5 or more drinks in a sitting) during the past 6 weeks. These criteria may have excluded females who were consuming smaller amounts of alcohol or experiencing no negative consequences associated with their alcohol use.

Additionally, ethnicity was examined to determine if it correlated with the quantity and frequency of alcohol use, negative consequences associated with alcohol use, or eBAC in the two conditions. Inclusion criteria for participation required that participants self-identify as Hispanic or non-Hispanic White. Other ethnicities were excluded from the sample due to the low rates of alcohol misuse reported among college students of other ethnicities (Wechsler et al., 1998; Wechsler et al., 2000). I examined ethnicity as a moderator variable based on previous research indicating that Hispanics within the ages of 18 and 25 have the highest prevalence of heavy drinking compared to Hispanics in every other age group (Ma & Shive, 2000). Further, previous research indicates that Hispanic college students report higher rates of drinking than students from other minority groups (Bennett et al., 1999). There were no significant interaction effects for any of the outcome variables, indicating that Hispanic and non-Hispanic White participants responded similarly to both of the conditions.

This finding may be an artifact of the low prevalence of Hispanic participants. Only nine of the 53 participants, 6% of the sample, self-identified as Hispanic. The University of Central Florida Office of Diversity Initiative indicates that 14% of the university population self-identified as Hispanic as of Fall 2009. The discrepancy between the percentage of Hispanic individuals in the university population and the current sample may be related to reluctance among Hispanic college students to participate in research related to alcohol use. Previous

research indicates that Hispanic individuals are less likely to seek traditional treatment for substance use problems and are less likely to receive specialized treatment to address these problems (Schmidt, Ye, & Greenfield, 2007). Additionally, Hispanics may struggle to relate to mainstream treatment approaches, which focus attention on the individual as the agent of change rather than common aspects of the Hispanic culture which involve the individual's family or community. These variables may account for the low representation of Hispanic participants in this sample.

Finally, responding in a socially desirable manner was examined to determine if it influenced the quantity and frequency of alcohol use, negative consequences associated with alcohol use, or eBAC in the two conditions. Socially desirable responding was examined to determine if behavioral changes were being influenced by an attempt to create a favorable impression and did not reflect real-life changes. Impression management theory states that individuals strive to maintain a positive impression on others and may falsify their actual attitudes or behaviors in an effort to maintain a positive impression (Tedesch et al., 1971). It was important to examine responding in a socially desirable manner in order to elucidate the mechanism of change occurring in the intervention. There were no significant interaction effects for any of the outcome variables, indicating that participants with low and high socially desirable responses responded similarly to both of the conditions.

It appears that self-presentation strategies and impression management did not influence participants' responses on the outcome measures. In other words, participants were not attempting to create a socially desirable image of a responsible alcohol consumer when responding to the outcome measures. While social role theory posits that behavioral change is influenced by external forces, cognitive dissonance theory and the hypocrisy paradigm

methodology posit that behavioral change results from internal desires to maintain a positive and consistent self-image. This finding lends support to the theory of cognitive dissonance in explaining the changes from pre-intervention to follow-up, suggesting that the behavioral changes observed in the current study are the by-product of internal sources.

### Other Variables

Cognitive dissonance was measured to determine whether participants in the hypocrisy paradigm condition differed in their reported level of cognitive dissonance following the intervention compared to participants in the control condition. This was based on previous research indicating that dissonance-related affect increases after participating in a dissonance-arousing substance use intervention similar to the hypocrisy paradigm (Simmons et al., 2004). This variable was included in an effort to shed light on the mechanism of behavior change and to determine if cognitive dissonance may be influencing the behavioral outcomes. There was no significant difference in cognitive dissonance for participants in the hypocrisy paradigm condition and participants in the control condition, suggesting that the hypocrisy paradigm was not more effective in arousing cognitive dissonance than the control condition.

It is possible that both interventions successfully aroused cognitive dissonance. There is no previous research examining the effectiveness of Alcohol101 Plus in arousing cognitive dissonance. Participants who complete Alcohol101 Plus receive normative feedback about their personal drinking patterns, and feedback-based interventions typically incorporate techniques from motivational interviewing, which was developed to elicit cognitive dissonance (Miller & Rollnick, 1991; 2002). Further, feedback-based interventions have been shown to be effective when delivered online (Neighbors et al., 2004). Further research is needed examining the utility

of Alcohol101 Plus in eliciting cognitive dissonance. Additionally, a physiological measure would provide a more sensitive measure of dissonance-related affect and may be useful in future research (Elliot & Devine, 1994).

A measure that assesses readiness for change was included to determine if the experimental conditions were effective at moving participants towards the Action stage of change (Prochaska & DiClemente, 1992). The Action stage of change involves overt behavioral modifications and changes in beliefs and attitudes (Prochaska, Diclemente, & Norcross, 1997). Previous research has found that inducing hypocrisy in an experimental setting leads to relatively long-term behavioral change (Aronson et al., 1991; Fried & Aronson, 1995; Stone et al., 1994). Simmons et al. (2004) found that participants who participated in a dissonance-arousing substance use intervention similar to the hypocrisy paradigm demonstrated more movement within the stages of change compared to an information-only condition. The current findings suggest no difference in the effectiveness of the two conditions at moving participants towards the Action stage of change.

Examination of the individual items of the SOCRATES indicate that the most common response immediately following intervention and at follow-up was either “No, strongly disagree” or “No, disagree” for all items except for the item stating “I have already started making some changes in my drinking.” The most frequent response for this item at intervention was “Yes, agree,” while it was “No, strongly disagree” at follow-up. One possible interpretation of these findings is that the current sample was already making changes in their drinking prior to participating in the intervention, thus placing them in the Action stage of change prior to their participation in the current study. However, this explanation is unlikely given the inclusion criteria requiring that participants report experiencing one or more negative consequences related

to alcohol use in the past year and engaging in a heavy drinking episode (i.e., 5 or more drinks in a sitting) during the past 6 weeks. A more likely explanation is that, since the SOCRATES was administered immediately following the interventions, the participants may have been experiencing cognitive dissonance, which theoretically would lead to an increase in motivation for change. Cognitive dissonance produces “self persuasion,” which has been shown to be a strong and relatively permanent form of persuasion leading to behavior change (Aronson, 1980). Therefore, it is possible that participants in both conditions were experiencing cognitive dissonance, which could account for the changes in the outcome measures reflected at follow-up. The return to “No, strongly disagree” at follow-up may reflect the permanent change in their cognitions in order to maintain a consistent self-concept (Aronson, 1968).

A final possible explanation for this finding is that participants were engaging in self-presentation strategies aimed at maintaining a positive impression to the research assistants. Impression management theory states that individuals may falsify their actual attitudes or behaviors in an effort to maintain a positive impression (Tedeschi et al., 1971). Analyses were conducted to determine if participants’ attempts to be perceived in a positive manner were influencing the SOCRATES scores. Scores on the MC-SDS were not found to be significantly influencing SOCRATES scores in the two conditions, thus indicating that participants’ attempts to be perceived in a positive manner did not influence their responses on the SOCRATES.

### Strengths and Limitations

This study contains several limitations that should be acknowledged when interpreting the findings. One limitation is the small number of Hispanic participants in the sample. Only 6% of the current sample self-identified as Hispanic, and there were four Hispanic sub-groups

represented within this Hispanic sample. This makes the generalizability of these findings extremely limited for Hispanic individuals. In addition to limited generalizability for Hispanic individuals, the sample used in this study was composed of college students who reported engaging in heavy episodic alcohol use and experiencing negative consequences as a result of their alcohol use. These inclusion criteria makes the generalizability of these findings limited for college students who are not engaging in heavy episodic alcohol use or experiencing negative consequences as a result of their alcohol use. A second limitation is the reliance on self-report measures of alcohol use. Alcohol use in general and heavy episodic alcohol use in particular carries stigma in the general population, especially for women (Matheson, 2008). Although a measure of social desirability was included in an effort to control for this, it is possible that participants may misreport their alcohol use and negative consequences associated with alcohol due to stigma associated with alcohol misuse. Further, participants may experience difficulty remembering their alcohol use for the past 30 days. Although the Timeline Follow-back procedure is a well validated measure that has been used extensively throughout the substance use research literature (Babor et al., 1987; Sobell & Sobell, 1992), it is possible that memory errors may have led to misreporting of alcohol use in the current sample.

A third limitation of this study is that the control group, Alcohol101 Plus, appears to be an active control group. Previous research suggests that although the most "risky" drinkers respond better to interpersonal interventions, the "typical" college drinker responds equally well to either an interpersonal intervention or a computer-based intervention (Elliott, Carey, & Bolles, 2008). Given that Alcohol101 Plus may be an active control group, it makes it difficult to interpret the finding that there was no difference between the two conditions (Kazdin, 1986). Exploratory examination of the pre-intervention and follow-up scores on the outcome variables

showed that both conditions seemed to lead to decreases on outcome variables, making the mechanism of change unclear.

A fourth limitation of the study is the attrition rate. There were forty participants (37%) lost to attrition. Attrition is a common problem in substance use research (Kranzler, Escobar, Lee, & Meza, 1996), and previous research suggests that participants who complete follow-ups report lower rates of substance use compared to those lost to attrition (Moos & Bliss, 1978; Walton, Ramanathan, & Reischl, 1998). Although attrition does not necessarily imply attrition bias, it can lead to lower statistical power to detect associations resulting from a smaller sample size (McCoy et al., 2008). Although multiple steps were taken to facilitate the opportunity to participate in the follow-up, the attrition rate was higher than desired. A final limitation of the study is the small sample size. The small sample size of participants might have precluded the detection of small to medium effects.

A strength of the study worth noting is the multiple methods employed to contact participants for follow-up. Attempts were made to contact participants through email, telephone, and personal letters to remind them about the opportunity to participate in the follow-up phase of the study. Additionally, they were given the choice to complete the follow-up online through Sona Systems (the online psychology research participant pool) or over the telephone with a research assistant. This was done to facilitate the convenience of completing the follow-up and to ensure that all participants were aware of the opportunity to participate.



## **CHAPTER FIVE: CONCLUSION**

### Future Directions and Current Implications

Future research should consider the use of a three-arm research design, which would include the hypocrisy paradigm condition, the Alcohol101 Plus control condition, and a wait-list/no-treatment control condition. This would allow for comparisons with a no-intervention control condition to determine if Alcohol101 Plus is an active control and to elucidate the mechanism of change for pre-intervention to follow-up outcomes in the hypocrisy paradigm condition. Future research should consider extending the follow-up period past one month in order to establish the clinical utility of the intervention by demonstrating stable and lasting behavior changes. Also, future research should include additional procedures to increase follow-up participation. Perhaps the use of a different compensation strategy, such as monetary gift cards, would increase the rates of participation in the follow-up. Finally, future research may want to consider using a more precise measure of alcohol use. Although self-report is a common method of assessing alcohol use in the current literature, a more precise method such as a breathalyzer may yield a more reliable and valid measurement of eBAC.

The link between heavy episodic alcohol use and numerous negative consequences among college students is well established, and the current research represents an effort to address the need for cost-effective empirically-supported alcohol interventions for college students. The original hypotheses that college students in the hypocrisy paradigm condition would experience a significant reduction in the number of negative consequences associated with their alcohol use, quantity and frequency of alcohol use, and average and peak eBAC compared to college students in the control condition was not supported. The finding that there were no

significant differences between the hypocrisy paradigm condition and the control condition are surprising given the previous research supporting the hypocrisy paradigm as a successful intervention for tobacco use and other social concerns. Given the current research design, it is impossible to determine if the lack of support for the original hypotheses is due to an actual lack of change in the hypocrisy paradigm condition or the inherent problems associated with comparison between two active conditions.

Although the original hypotheses for between-condition differences were not supported, exploratory analyses were conducted examining within-condition changes from pre-intervention to follow-up. Participants in the hypocrisy paradigm demonstrated significant decreases on all outcome variables including negative consequences associated with alcohol use, average and peak eBAC, and quantity and frequency of alcohol use. Participants in the control condition only demonstrated decreases in negative consequences associated with alcohol use and frequency of alcohol use. Without an inactive comparison group, the mechanism of change cannot be identified and it cannot be conclusively stated that the hypocrisy paradigm was effective. The exploratory analyses lend support for the possible effectiveness of the hypocrisy paradigm in reducing alcohol use and related consequences; however this interpretation cannot be decisively stated given the lack of a true control condition. Further research is necessary to conclusively support the hypocrisy paradigm as an effective intervention for alcohol use among college students, and the exploratory analyses lend support for pursuing this line of research.

#### Theoretical Implication

Self presentation strategies were included as a possible alternative explanation for cognitive dissonance, however the current findings do not lend support for this theoretical view.

Attempts by participants to be perceived in a positive manner were not found to differ between groups or influence outcomes. This suggests that external sources, such as a desire to create a positive impression on others, were not the mechanism of change influencing the outcomes observed in the current study.

It is more likely that cognitive dissonance was the mechanism of change in the current study and influenced the reductions on the outcome measures. The methodology used in the experimental intervention led to two dissonant cognitions: a) that participants are responsible alcohol consumers; and b) that participants have misused alcohol in the past. The dissonant cognitions that participants were both a responsible and irresponsible consumer of alcohol theoretically led to discomfort, particularly because the cognitions were rooted in self-concept. Aronson and Carlsmith (1962) posit that psychological discomfort occurs when individuals' self-concepts are threatened, and the current methodology was designed to affect self-concept by eliciting feelings of hypocrisy. Further, Steele and Liu (1983) agree that cognitive dissonance processes stem from sense of self, and the impact of feelings of hypocrisy on self concept is thought to be the mechanism of change observed in previous studies implementing the hypocrisy paradigm methodology.

Although cognitive dissonance is possibly the mechanism of change explaining the outcomes observed in the current study, it is also possible that social role theory explains the current findings. The methodology used in the hypocrisy paradigm places the participant in the role of "mentor" for high-school students. Although there is a large body of research examining the impact of role modeling on the mentee, there is less research examining the impact of mentoring on the mentor. It is possible that the observed changes in the current study are the result of role conformity rather than cognitive dissonance processes. While cognitive dissonance

is theoretically rooted in self-concept, there is a lack of empirical evidence demonstrating that self-concept is the mechanism of change influencing the effects on behavior. The current study does not support self-presentation strategies as a mechanism of change; however role conformity can be internalized thus making it a visceral process similar to cognitive dissonance. A possible explanation for the current findings is that the participants internalized the role of mentor, thus internalizing the attitudes, beliefs, and expectations associated with an individual who mentors high-school students. This internalized role may explain the observed behavioral changes.

In summary, both cognitive dissonance and social role theory can result from internal processes, and the current study does not lend support for one theory over the other. The findings suggest that self-presentation strategies do not explain the reductions in negative consequences associated with alcohol use, estimated blood alcohol concentration, and quantity and frequency of alcohol use observed from pre-intervention to follow-up. Whether the product of internalized role conformity or discomfort resulting from feelings of hypocrisy, the current findings appear to suggest an internal process as the mechanism of change explaining the reductions on outcome measures.

**APPENDIX A: IRB APPROVAL LETTER**



University of Central Florida Institutional Review Board  
Office of Research & Commercialization  
12201 Research Parkway, Suite 501  
Orlando, Florida 32826-3246  
Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

## Notice of Full Board Review and Approval of a New Study

From : UCF Institutional Review Board  
FWA00000351, Exp. 10/8/11, IRB00001138

To : Mary Hammons and Charles Negy

Date : February 16, 2009

IRB Number: SBE-08-05861

Study Title: **Examining the Hypocrisy Paradigm as an Intervention for Modifying High-Risk Alcohol Use Behaviors among Hispanic College Students**

Dear Researcher:

Your research protocol noted above was reviewed by the University of Central Florida Institutional Review Board (IRB) at a convened meeting on January 28, 2009. Having received the revisions, clarifications and acknowledgement of stipulations requested by the Board, you may now proceed with your research and begin enrolling participants and collecting data and/or specimens\*\*. **The expiration date is January 27, 2010.** The IRB determined this study to be greater than minimal risk for human subjects. The IRB has determined that the federally mandated criteria at 45 CFR 46, 45 CFR 164, and/or 21 CFR 50 & 56 for IRB approval of research have been met. This study requires full board review and approval for renewal.

**\*\*AS PREVIOUSLY REQUESTED – A Certificate of Confidentiality must be obtained before this research can begin. Please provide a copy to the UCF IRB office when the certificate becomes available.**

The IRB has approved a **waiver of documentation of consent** for the online survey(s) portion of the research. Participants do not have to sign a consent form, but the IRB requires that you give participants a copy of the IRB-approved consent form, letter information sheet. For online surveys, please advise participants to print out the consent document for their files.

The IRB has approved a **consent procedure which requires participants to sign consent forms when meeting with the investigators.** Use of the approved, stamped consent document(s) is required. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Subjects or their representatives must receive a copy of the consent form(s).

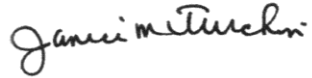
All data, including all signed consent form documents, must be retained in a locked file cabinet for a minimum of three years past the completion of this research. Signed HIPAA Authorization forms and HIPAA Waivers of Authorization must be retained for a minimum of 6 years passed the date of study completion. Any links to the identification of participants should be maintained on a password-protected computer if electronic information is used. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel. Advise the IRB if you receive a subpoena for the release of this information, or if a breach of confidentiality occurs.

Unanticipated problems or serious adverse events must be reported within 5 working days by submitting either the Unanticipated Problem and Notable Event Report Form or the Serious Adverse Event Form. Do not make changes to the protocol methodology, consent form or other study documents before obtaining IRB approval. Minor changes to this research may be approved by expedited review and should be submitted using the online Addendum/Modification Request Form. To continue this research beyond the expiration date, a Continuing Review Application Form must be submitted 8 weeks prior to the expiration date. **Failure to submit a Continuing**

**Review Application Form could lead to study suspension, a loss of funding and/or publication possibilities, or reporting of noncompliance to sponsors or funding agencies.** An Addendum/Modification Request Form **cannot** be used to extend the approval period of a study. Upon completion of the study, please submit a Termination/Final Report Form. All submission forms may be found in the iRIS system. The IRB maintains the authority under 45 CFR 46.110(e) to observe or have a third party observe the consent process and the research.

On behalf of Tracy Dietz, Ph.D., UCF IRB Chair, this letter is signed by:

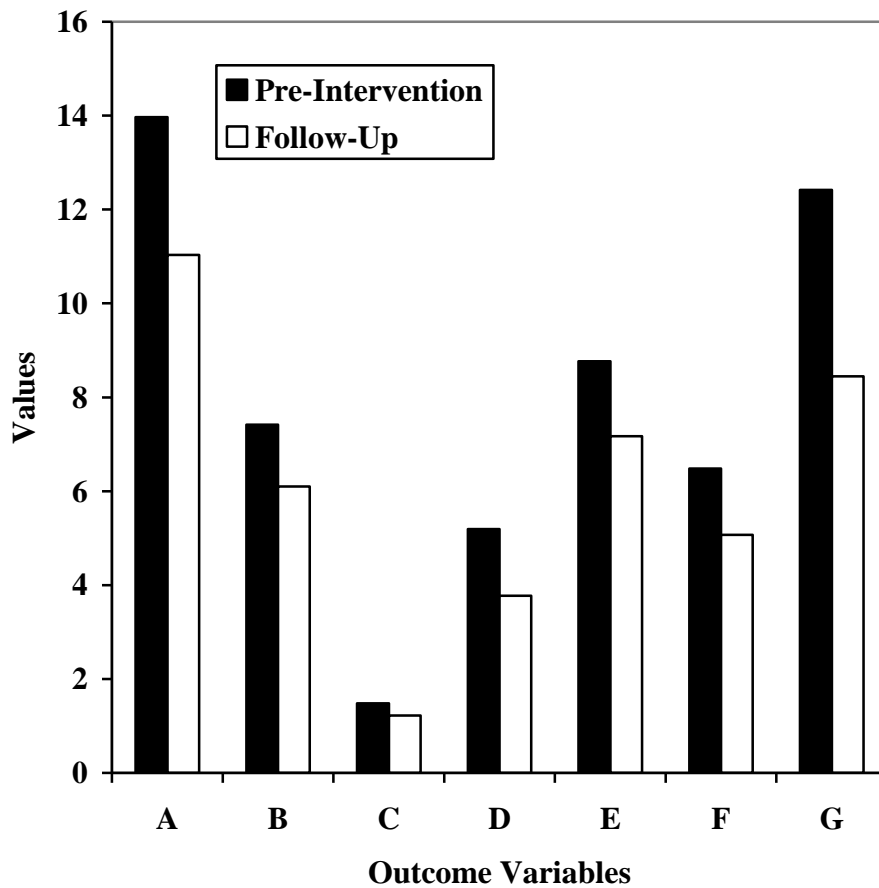
Signature applied by Janice Turchin on 02/16/2009 01:59:01 PM EST

A handwritten signature in black ink that reads "Janice Turchin". The signature is written in a cursive style with a large initial "J".

IRB Coordinator

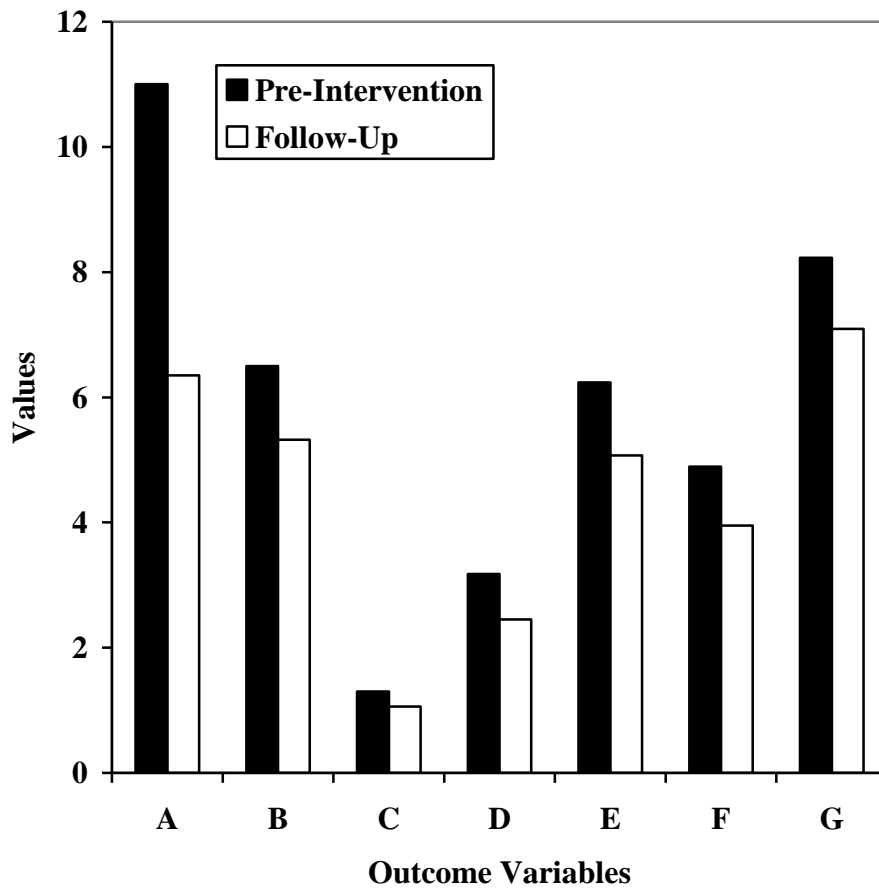
## **APPENDIX B: FIGURES**





- A = Negative consequences associated with alcohol use
- B = Number of days drinking per month
- C = Average number of days drinking per week
- D = Number of days meeting “binge drinking” criteria
- E = Average number of drinks per week
- F = Average number of drinks per drinking occasion
- G = Highest number of drinks per drinking occasion

Figure 1. Mean scores on outcome variables from pre-intervention to follow-up for the hypocrisy paradigm intervention



- A = Negative consequences associated with alcohol use
- B = Number of days drinking per month
- C = Average number of days drinking per week
- D = Number of days meeting “binge drinking” criteria
- E = Average number of drinks per week
- F = Average number of drinks per drinking occasion
- G = Highest number of drinks per drinking occasion

Figure 2. Mean scores on outcome variables from pre-intervention to follow-up for the control condition.

## **APPENDIX C: TABLES**

Table 1. Demographic Information for the Hypocrisy Paradigm and the Control Conditions

<b>Demographic Variables</b>		<b>Hypocrisy Paradigm (N)</b>	<b>Control (N)</b>
<b>Gender</b>	Male	14	8
	Female	17	14
<b>Ethnicity</b>	Hispanic	6	3
	Non-Hispanic		
	White	25	19
<b>Class Standing</b>	Freshmen	15	11
	Sophomore	5	5
	Junior	5	4
	Senior	6	2
<b>Marital Status</b>	Single	30	21
	Married	1	1
<b>Age</b>	18 years-old	14	10
	19 years-old	7	7
	20 years-old	3	1
	≤ 21 years-old	7	4

Table 2. Negative Consequences, eBAC, and Quantity/Frequency Mean Scores for the Two Conditions Across Two Time Periods

Outcome Variable	Pre-Intervention				Follow-Up			
	Control		HP <sup>h</sup>		Control		HP <sup>h</sup>	
	M	SD	M	SD	M	SD	M	SD
Negative Consequences <sup>a</sup>	11.00	7.80	13.97	7.91	6.36	5.88	11.03	9.09
Typical eBAC <sup>b</sup>	.10	.08	.12	.06	.07	.05	.09	.06
Peak eBAC <sup>c</sup>	.18	.13	.26	.16	.14	.13	.17	.12
Average number drinks <sup>d</sup> per week	6.24	5.00	8.77	6.39	5.07	5.39	7.17	6.47
Number of days drinking per month <sup>e</sup>	6.50	4.22	7.42	5.24	5.32	4.45	5.07	3.10
Frequency of days meeting “binge” criteria <sup>f</sup>	3.18	3.03	5.19	4.37	2.45	2.87	3.77	3.07
Average number of days drinking per week <sup>g</sup>	1.30	.84	1.48	1.05	1.06	.89	1.22	.83

<sup>a</sup>Negative Consequences as measured by the Young Adult Alcohol Consequences Questionnaire (YAACQ)

<sup>b</sup>Typical estimated blood alcohol concentration (eBAC) as measured by the Timeline Follow-Back (TLFB) using the Matthews and Miller (1979) equation

<sup>c</sup>Peak eBAC as measured by the Timeline Follow-Back (TLFB)

<sup>d</sup>Average number of drinks per week as measured by the Timeline Follow-Back (TLFB)

<sup>e</sup>Number of days drinking per month as measured by the Timeline Follow-Back (TLFB)

<sup>f</sup>Frequency of days meeting “binge” criteria as measured by the Timeline Follow-Back (TLFB)

<sup>g</sup>Average number of days drinking per week as measured by the Timeline Follow-Back (TLFB)

<sup>h</sup>Hypocrisy paradigm (HP) experimental condition

Table 3. One-Way ANCOVAs: Mean and Standard Deviation Scores for the Two Conditions Across Two Time Periods

Outcome Variable	Pre-Intervention				Follow-Up			
	Control		HP <sup>c</sup>		Control		HP <sup>c</sup>	
	M	SD	M	SD	M	SD	M	SD
Average number drinks per drinking occasion <sup>a</sup>	4.89	2.39	6.48	2.53	3.95	2.58	5.07	3.10
Highest number of drinks per drinking occasion <sup>b</sup>	8.23	4.01	12.42	6.41	7.09	6.14	8.45	5.75

<sup>a</sup>Average number of drinks per drinking occasion as measured by the Timeline Follow-Back (TLFB)

<sup>b</sup>Highest number of drinks per drinking occasion as measured by the Timeline Follow-Back (TLFB)

<sup>c</sup>Hypocrisy paradigm (HP) experimental condition

Table 4. Negative Consequences, eBAC, and Quantity/Frequency Mean and Standard Deviation Scores for the Two Conditions Across Two Time Periods for Males and Females

Outcome Variable	Pre-Intervention				Follow-Up			
	Control M(SD)		HP <sup>j</sup> M(SD)		Control M(SD)		HP <sup>j</sup> M(SD)	
	Male (N = 8)	Female (N = 14)	Male (N = 14)	Female (N = 17)	Male	Female	Male	Female
Negative Consequences <sup>a</sup>	13.75(6.67)	9.43(8.19)	11.79(8.16)	15.76(7.46)	8.00(8.16)	5.43(4.16)	9.21(8.67)	12.53(9.42)
Typical eBAC <sup>b</sup>	.06(.03)	.12(.09)	.11(.05)	.13(.07)	.05(.05)	.08(.05)	.09(.05)	.09(.07)
Peak eBAC <sup>c</sup>	.13(.08)	.21(.15)	.24(.14)	.27(.17)	.14(.15)	.15(.13)	.16(.08)	.17(.14)
Average number drinks per week <sup>d</sup>	7.47(5.09)	5.53(4.99)	11.31(7.42)	6.67(4.63)	5.78(5.15)	4.67(5.66)	10.31(7.84)	4.59(3.59)
Number of days drinking per month <sup>e</sup>	8.00(4.50)	5.64(3.95)	9.71(6.54)	5.53(2.87)	5.88(5.57)	5.00(3.88)	7.71(4.92)	4.76(2.88)
Frequency of days meeting “binge” criteria <sup>f</sup>	3.23(2.66)	3.14(3.32)	7.00(5.70)	3.71(2.05)	2.63(2.92)	2.36(2.95)	4.86(3.61)	2.88(2.28)
Average number of days drinking per week <sup>g</sup>	1.60(.90)	1.13(.79)	1.94(1.31)	1.11(.57)	1.18(1.11)	1.00(.78)	1.54(.98)	.95(.58)
Average number drinks per drinking occasion <sup>h</sup>	4.45(1.39)	5.15(2.83)	7.17(2.88)	5.92(2.13)	3.98(3.24)	3.92(2.26)	6.37(3.08)	4.00(2.77)
Highest number of drinks per drinking occasion <sup>i</sup>	8.50(3.51)	8.07(4.39)	14.21(7.18)	10.94(5.47)	8.50(8.07)	6.29(4.89)	9.79(5.07)	7.35(6.18)

<sup>a</sup>Negative Consequences as measured by the Young Adult Alcohol Consequences Questionnaire (YAACQ)

<sup>b</sup>Typical estimated blood alcohol concentration (eBAC) as measured by the Timeline Follow-Back (TLFB) using the Matthews and Miller (1979) equation

<sup>c</sup>Peak eBAC as measured by the Timeline Follow-Back (TLFB)

<sup>d</sup>Average number of drinks per week as measured by the Timeline Follow-Back (TLFB)

<sup>e</sup>Number of days drinking per month as measured by the Timeline Follow-Back (TLFB)

<sup>f</sup>Frequency of days meeting “binge” criteria as measured by the Timeline Follow-Back (TLFB)

<sup>g</sup>Average number of days drinking per week as measured by the Timeline Follow-Back (TLFB)

<sup>h</sup>Average number of drinks per drinking occasion as measured by the Timeline Follow-Back (TLFB)

<sup>i</sup>Highest number of drinks per drinking occasion as measured by the Timeline Follow-Back (TLFB)

<sup>j</sup>Hypocrisy paradigm (HP) experimental condition

Table 5. Negative Consequences, eBAC, and Quantity/Frequency Mean and Standard Deviation Scores for the Two Conditions Across Two Time Periods for Hispanics and Non-Hispanic Whites

Outcome Variable	Pre-Intervention				Follow-Up			
	Control M(SD)		HP <sup>j</sup> M(SD)		Control M(SD)		HP <sup>j</sup> M(SD)	
	Hispanic (N = 3)	White (N = 19)	Hispanic (N = 6)	White (N = 25)	Hispanic	White	Hispanic	White
Negative Consequences <sup>a</sup>	13.33(10.50)	10.63(7.60)	6.83(4.58)	15.68(7.63)	9.33(12.10)	5.89(4.72)	6.33(4.18)	12.16(9.64)
Typical eBAC <sup>b</sup>	.13(.11)	.09(.07)	.10(.07)	.12(.06)	.05(.05)	.08(.05)	.06(.07)	.09(.06)
Peak eBAC <sup>c</sup>	.23(.21)	.18(.12)	.24(.19)	.26(.15)	.09(.10)	.16(.14)	.11(.09)	.18(.12)
Average number drinks per week <sup>d</sup>	8.67(6.22)	5.85(4.87)	6.27(6.67)	9.37(6.31)	3.67(5.03)	5.29(5.54)	3.00(2.79)	8.18(6.74)
Number of days drinking per month <sup>e</sup>	6.67(3.79)	6.47(4.38)	5.50(5.68)	7.88(5.14)	3.33(3.51)	5.63(4.59)	3.83(3.71)	6.64(4.12)
Frequency of days meeting “binge” criteria <sup>f</sup>	4.00(4.00)	3.05(2.97)	2.83(2.79)	5.76(4.53)	2.00(2.65)	2.53(2.97)	1.33(1.21)	4.36(3.11)
Average number of days drinking per week <sup>g</sup>	1.33(.76)	1.29(.88)	1.10(1.14)	1.58(1.03)	.67(.70)	1.13(.92)	.77(.74)	1.33(.82)
Average number drinks per drinking occasion <sup>h</sup>	6.78(4.65)	4.60(1.90)	5.73(3.19)	6.67(2.39)	3.13(3.38)	4.07(2.52)	3.60(3.89)	5.42(2.87)
Highest number of drinks per drinking occasion <sup>i</sup>	9.67(6.51)	8.00(3.70)	11.50(8.02)	12.64(6.14)	5.33(6.11)	7.37(6.26)	5.67(4.80)	9.12(5.84)

<sup>a</sup>Negative Consequences as measured by the Young Adult Alcohol Consequences Questionnaire (YAACQ)

<sup>b</sup>Typical estimated blood alcohol concentration (eBAC) as measured by the Timeline Follow-Back (TLFB) using the Matthews and Miller (1979) equation

<sup>c</sup>Peak eBAC as measured by the Timeline Follow-Back (TLFB)

<sup>d</sup>Average number of drinks per week as measured by the Timeline Follow-Back (TLFB)

<sup>e</sup>Number of days drinking per month as measured by the Timeline Follow-Back (TLFB)

<sup>f</sup>Frequency of days meeting “binge” criteria as measured by the Timeline Follow-Back (TLFB)

<sup>g</sup>Average number of days drinking per week as measured by the Timeline Follow-Back (TLFB)

<sup>h</sup>Average number of drinks per drinking occasion as measured by the Timeline Follow-Back (TLFB)

<sup>i</sup>Highest number of drinks per drinking occasion as measured by the Timeline Follow-Back (TLFB)

<sup>j</sup>Hypocrisy paradigm (HP) experimental condition



Table 6. Negative Consequences, eBAC, and Quantity/Frequency Mean and Standard Deviation Scores for the Two Conditions Across Two Time Periods for Low and High MC-SDS<sup>a</sup> scores

Outcome Variable	Pre-Intervention				Follow-Up			
	Control M(SD)		HP <sup>k</sup> M(SD)		Control M(SD)		HP <sup>k</sup> M(SD)	
	Low (N = 13)	High (N = 9)	Low (N = 19)	High (N = 12)	Low	High	Low	High
Negative Consequences <sup>b</sup>	12.15(6.97)	9.33(9.03)	16.32(6.94)	10.25(8.20)	8.23(6.77)	3.67(2.83)	11.84(9.15)	9.75(9.25)
Typical eBAC <sup>c</sup>	.09(.08)	.11(.08)	.13(.06)	.10(.06)	.07(.05)	.07(.06)	.09(.07)	.08(.06)
Peak eBAC <sup>d</sup>	.17(.14)	.20(.12)	.29(.16)	.21(.14)	.16(.13)	.14(.14)	.19(.13)	.13(.09)
Average number drinks per week <sup>e</sup>	6.45(5.69)	5.93(4.10)	10.15(6.98)	6.58(4.80)	4.75(4.51)	5.53(6.73)	8.76(7.66)	4.67(2.65)
Number of days drinking per month <sup>f</sup>	6.85(4.67)	6.00(3.67)	8.16(5.88)	6.25(3.98)	5.38(4.66)	5.22(4.41)	6.63(4.76)	5.25(2.90)
Frequency of days meeting “binge” criteria <sup>g</sup>	3.15(3.51)	3.22(2.39)	6.26(5.03)	3.50(2.35)	2.54(2.90)	2.33(3.00)	4.32(3.58)	2.92(1.88)
Average number of days drinking per week <sup>h</sup>	1.37(.93)	1.20(.73)	1.63(1.18)	1.25(.80)	1.08(.93)	1.04(.88)	1.33(.95)	1.05(.58)
Average number drinks per drinking occasion <sup>i</sup>	4.79(2.86)	5.05(1.65)	7.33(2.57)	5.14(1.86)	3.79(2.57)	4.17(2.73)	5.79(3.55)	3.93(1.82)
Highest number of drinks per drinking occasion <sup>j</sup>	7.77(4.46)	8.89(3.41)	14.00(6.33)	9.92(5.93)	7.15(6.68)	7.00(5.66)	9.84(6.56)	6.25(3.33)

<sup>a</sup>Socially desirable response style as measured by the Marlowe-Crowne Social Desirability Scale-Short Form (MC-SDS)

<sup>b</sup>Negative Consequences as measured by the Young Adult Alcohol Consequences Questionnaire (YAACQ)

<sup>c</sup>Typical estimated blood alcohol concentration (eBAC) as measured by the Timeline Follow-Back (TLFB) using the Matthews and Miller (1979) equation

<sup>d</sup>Peak eBAC as measured by the Timeline Follow-Back (TLFB)

<sup>e</sup>Average number of drinks per week as measured by the Timeline Follow-Back (TLFB)

<sup>f</sup>Number of days drinking per month as measured by the Timeline Follow-Back (TLFB)

<sup>g</sup>Frequency of days meeting “binge” criteria as measured by the Timeline Follow-Back (TLFB)

<sup>h</sup>Average number of days drinking per week as measured by the Timeline Follow-Back (TLFB)

<sup>i</sup>Average number of drinks per drinking occasion as measured by the Timeline Follow-Back (TLFB)

<sup>j</sup>Highest number of drinks per drinking occasion as measured by the Timeline Follow-Back (TLFB)

<sup>k</sup>Hypocrisy paradigm (HP) experimental condition

Table 7. Mean and Standard Deviation Scores for Scale Scores on the SOCRATES<sup>a</sup> Across Two Time Periods

Outcome Variable	Pre-Intervention				Follow-Up			
	Control		HP <sup>e</sup>		Control		HP <sup>e</sup>	
	M	SD	M	SD	M	SD	M	SD
Recognition <sup>b</sup>	9.95	3.44	10.71	3.63	9.01	1.64	10.90	3.81
Ambivalence <sup>c</sup>	6.36	2.80	7.29	3.14	6.36	1.73	7.45	3.24
Taking Steps <sup>d</sup>	16.73	7.60	16.71	6.72	16.55	7.44	18.23	7.75

<sup>a</sup>Readiness to make changes in alcohol use behaviors as measured by the Stages of Change Readiness and Treatment Eagerness Scale, version 8-Alcohol (SOCRATES)

<sup>b</sup>Recognition of problems related to alcohol use as measured by the Recognition scale of the SOCRATES

<sup>c</sup>Uncertainty about making changes in alcohol use as measured by the Ambivalence scale of the SOCRATES

<sup>d</sup>Making positive changes in alcohol use behaviors as measured by the Taking Steps scale of the SOCRATES

<sup>e</sup>Hypocrisy paradigm (HP) experimental condition

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