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Can Coping Information Enhance the Effectiveness of a Personalized Normative Feedback Intervention

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CAN COPING INFORMATION ENHANCE THE EFFECTIVENES OF A
PERSONALIZED NORMATIVE FEEDBACK INTERVENTION?

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CAN COPING INFORMATION ENHANCE THE EFFECTIVENESS OF A
PERSONALIZED NORMATIVE FEEDBACK INTERVENTION?

by

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DISSERTATION

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Abstract

In reaction to the national health objective of reducing the proportion of college students engaging in heavy at-risk drinking, the addition of Personalized Coping Feedback (PCF) to a standard Personalized Normative Feedback (PNF) intervention was examined. Approximately 501 college students at the University of Texas at El Paso were recruited to participate during the spring, summer, and fall 2011 semesters. The purpose of the study was to investigate if the addition of a coping component to a standard PNF intervention would have a stronger impact on reducing alcohol risk levels, alcohol-related problems, and alcohol consumption than using standard PNF intervention. A secondary purpose of the study was to explore if coping mediated program outcomes when information on it was included in a brief PNF intervention. Participants were randomly assigned to one of three conditions, a standard PNF condition, a standard PNF + PCF condition, or an education only control condition. Two way 3x2 mixed factorial ANOVA examined between group differences primarily on alcohol risk levels, alcohol-related problems, and alcohol consumption. Results of this study did not support the hypotheses of differential effectiveness across the experimental conditions and enhancement of PNF interventions through inclusion of information and feedback on coping. Specifically, tests of the key two- and three-way interactions were not significant for any of the drinking outcomes. Overall, the results appeared to show modest declines over time among all the alcohol consumption measures, which was positive from a public health standpoint, however, similar rates of decline were seen among all three conditions. In general, these effects were medium to large in size, using standard conventions for η^2 effect sizes, as Cohen (1992).

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Chapter 1

Introduction

Problem drinking is a major public health issue in part due to the high prevalence in student populations (Wechsler, Lee, Kuo, Seibring, Nelson, & Lee, 2002). For example, an estimated 44% of college students reported they had engaged in binge drinking (i.e., five or more drinks in a row for men and 4 or more drinks in a row for women on the same occasion) in the past 2 weeks in a study conducted across four public college schools (Wechsler et al., 2002). Moreover, between 1993 and 2001, rates of binge-drinking episodes had the largest increase (56%) among young adults age 21 to 25 and underage drinkers aged 18 to 20 (Naimi, Brewer, Mokdad, Denny, Serdula, & Marks, 2003). In addition, problem drinking is linked to a formidably wide range of negative consequences among young adults including physical injuries, sexual assaults, and academic consequences. Although alcohol use and abuse cuts across gender, race, and age, alcohol-related problems are highest among young adults ages 18-29 according to study results from the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; NIAAA, 2004).

Fortunately, alcohol misuse among college students is highly preventable, as such; this age group may benefit most from research based alcohol interventions. A variety of behavioral approaches have been developed specifically targeted at reducing alcohol consumption and related risks among college student populations. In one popular approach for example, brief interventions have shown strong support as strategies for curbing drinking in the college student population. Particularly, brief Personalized Normative Feedback (PNF) interventions have been proven effective as an indicated prevention or intervention aimed at individuals at risk for alcohol-related problems (Larimer & Cronce, 2002; Walters & Neighbors, 2005). These interventions are particularly effective in correcting misperceptions about alcohol-related social and behavioral norms. They work especially well in the college population by providing students with accurate normative information based on college student samples. The key theory to these

PNF approaches to curbing alcohol consumption and related problems is that students care about how they compare with their peers and will be motivated to change their drinking patterns relative to others (Neighbors, Larimer, & Lewis, 2004). Considerable research has shown that providing accurate norms about the drinking of others on college campuses is sufficient to motivate a student to reduce his/her drinking (Dimeff, Baer, Kivlahan, & Marlatt, 1999; Collins, Carey, Sliwinski, 2002; Lewis & Neighbors, 2004; Borsari & Carey, 2005). As will be shown, much research has focused on the prevention and reduction of alcohol use and abuse among college students with a large body of literature evidence supporting PNF strategies in targeting these individual student drinkers.

Despite the effectiveness of PNF interventions a couple of issues remain. First effect sizes tend to be relatively small and diminish over time suggesting not all higher risk drinkers may benefit from standard PNF interventions. Second, and most importantly, it is not clear what mediating mechanisms are responsible for the efficacious nature of these interventions. As such, additional research is needed on ways of boosting the intervention impact and more clearly delineating the mediating mechanisms underlying such effects.

Although PNF interventions have proven efficacious in alcohol interventions, several authors have suggested that adding a component on coping may enhance their effectiveness (Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Williams, Herman-Stahl, Calvin, Pemberton, & Bradshaw, 2009; Fager, 2004). Indeed, significant direct correlations have confirmed coping related to high levels of alcohol consumption and especially alcohol-related problems (Neighbors, et al., 2007; Tomaka, Morales-Monks, Shamaley-Kornatz, & Thompson, in press; and Williams, et al., 2009). These data confirm that coping variables play a particularly important role in alcohol related outcomes (Neighbors, et al.) and may enhance PNF intervention research.

Statement of the Problem

Accordingly, the primary purpose of the current study was to investigate the potential

importance of coping in reducing alcohol risk levels, alcohol-related problems, and consumption in a brief PNF intervention. Specifically, the study investigated if the addition of a coping component had a stronger impact on reducing alcohol risk levels, alcohol-related problems, and alcohol consumption than a standard PNF intervention. A secondary objective was to explore if coping, as a factor, mediated program outcomes when included in a brief PNF intervention.

Hypotheses

In sum, the study had two hypotheses, (a) participants in the enhanced PNF intervention, with the added coping feedback component, would experience greater reductions in alcohol risk levels, alcohol-related problems, and alcohol consumption than participants in the standard PNF intervention, (b) coping would serve as an additional mediator of intervention effects, along with descriptive norms, in the condition that includes the coping information.

Chapter 2

Review of the Research

Heavy alcohol use is defined by the Substance Abuse and Mental Health Services Administration (SAMHSA) as having five or more drinks at least once a week per typical drinking occasion and heavy episodic drinking is having five or more drinks in one sitting on at least five different days in the past 30 days (SAMHSA, 2002). Binge drinking, traditionally defined by most college drinking studies as having 5 or more drinks in a row for men and 4 or more drinks in a row for women on the same occasion, was redefined by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) in 2004, as the amount of alcohol leading to a blood alcohol content (BAC) of .08 which for most adults would be reached by consuming five drinks or for men or four for women over a 2-hour period (NIAAA, 2004).

According to findings from SAMHSA (2007) in 2007, rates of current alcohol use in the general population were 50.7 percent among persons aged 18 to 20 and 68.3 percent of 21 to 25 year olds. Moreover, the highest prevalence of both binge and heavy drinking was for young adults aged 18 to 25, with the peak rate occurring at age 21. Rates of binge drinking were 35.7 percent for persons aged 18 to 20 and peaked at 45.9 percent among those aged 21 to 25. Although college students commonly binge drink, 70% of binge drinking episodes involve adults over the age of 25 (Naimi, Brewer, Mokdad, Clark, Serdula, & Marks, 2003). In addition, heavy alcohol use is reported by 14.7 percent of persons aged 18 to 25 (SAMHSA, 2007).

Consumption and binge drinking rates tend to be higher in college students than the general population. For example, according to the NIAAA (2002), among college students, about 80 percent drink alcohol, about 40 percent binge drink, and about 20 percent binge drink three or more times within a 2-week period. According to Wechsler et al. (2002), over 40 percent of college students report having engaged in heavy drinking episodes at least once in the past two weeks. Two additional studies found approximately 39 to 44 percent of students reported binge drinking within the 2 weeks prior to assessment (Johnston, O'Malley, Bachman &

Schulenberg, 2003; Weschsler et al.). Young adults between the ages of 20-23 (males) and 18-21 (females) had the highest number of drinking days among all individuals ages 14-65 in the past 30 days, consuming 5 or more drinks according to findings from the National Survey on Drug Use and Health in 2005 (SAMHSA, 2006) .

Although, heavy episodic or binge drinking patterns of alcohol use have been of particular concern, rates of alcohol abuse and dependence are also high among college students as 31 percent of college students met criteria for a diagnosis of alcohol abuse and 6 percent for a diagnosis of alcohol dependence in the past 12 months, according to questionnaire-based self-reports about their drinking (Knight et al., 2002). The DSM-IV defines alcohol abuse as consisting of one or more of the four criteria for abuse which includes (a) recurrent substance use resulting in failure to fulfill major role obligations at work or school, (b) recurrent substance use in situations in which it is physically hazardous such as operating machinery, (c) recurrent substance related legal problems of arrests, and (d) continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance. The DSM-IV defines alcohol dependence as manifested by three or more of signs of abuse including compulsive drinking behavior, tolerance, and withdrawal. More specifically this includes (a) tolerance as defined by a need for markedly increased amounts of a substance to achieve intoxication or desired effect or diminished effect with continued use, (b) withdrawal as manifested by withdrawal syndrome for the substance or the substance taken to relieve or avoid withdrawal symptoms, (c) the substance often taken in larger amounts or over a longer period, (d) persistent desire or unsuccessful efforts to cut down or control substance use, (e) lots of time spent in activities to obtain the substance, use it or recover from its effects, (f) giving up important social, occupational , or recreational activities because of substance use, and (g) continuing substance use despite knowledge of having recurrent or persistent physical or psychological problems.

Of particular concern from the high prevalence of alcohol use, misuses, and abuse

among young adults, are consumption patterns resulting in a wide range of negative consequences (Hingson, Heeren, Winter, & Wechsler, 2005). Negative consequences include risky sexual behavior, physical and sexual assaults, potential negative effects on a still developing brain, problems in school, at work, and with the legal system (NIAAA, 2007). Even various types of physical injury can occur including, car crashes, drunk driving crashes, homicide, suicide, and death from alcohol poisoning (NIAAA, 2007). For example, approximately 2.1 million students drove under the influence of alcohol in the prior year (Hingson, Heeren, Zakocs, Kopstein & Wechsler, 2002). Even more evidence in a study by among 18-24 year olds shows, high-risk college drinking resulted in 599,000 unintentional injuries under the influence of alcohol with 1,700 deaths from those alcohol-related unintentional injuries, including motor vehicle crashes. In addition, other students who had been drinking assaulted more than 696,000 students and more than 97,000 students were victims of alcohol-related sexual assault or date rape, with 400,000 students having participated in unprotected sex (Hingson et al., 2005). Finally, roughly 25 percent of college students report academic consequences of their own drinking including missing class, falling behind, doing poorly on exams or papers, and receiving lower grades overall (Engs, Diebold, & Hansen, 1996; Presley, Meilman, & Cashin, 1996; Wechsler, et al., 2002).

Alcohol use and abuse among college students is a high priority among researchers, organizations, and communities. The seriousness of this problem attracted the attention of federal agencies leading the issue to become a national health objective. One of the leading Health Objectives, Objective 26, of Healthy People 2010 is to reduce substance abuse to protect the health, safety, and quality of life for all, especially children. Even more specifically, Objective 26-11b aims to reduce the proportion of persons engaging in binge drinking of alcoholic beverages among college students, Objective 26-12 aims to reduce average annual alcohol consumption among all persons aged 14 years, and older, and Objective 26-13 aims to reduce the proportion of adults who exceed guidelines for low-risk drinking (number of drinks

per week).

Although significant, excessive alcohol use among college students is a preventable threat to health. Indeed, much research has focused on the prevention and reduction of alcohol use and abuse among college students. Overall, evidence supports strategies targeting individual student drinkers. Among college students, effective interventions have included--alone or in combination--aspects of cognitive-behavioral skills, norms clarification, and motivational enhancement interventions. Cognitive-behavioral skills interventions attempt to change an individual's beliefs and thinking about the use of alcohol through such activities as altering alcohol effects expectancies, documenting daily alcohol consumption, or learning to manage stress (Task Force of the National Advisory Council on Alcohol Abuse and Alcoholism (TFNACAAA), 2002). Norms or values clarification interventions examine a student's perceptions about the acceptability of drinking behavior on campus and uses data to refute beliefs such as the tolerance for excessive drinking, the number of students who drink excessively and how much they consume (TFNACAAA, 2002). Lastly, motivational enhancement type interventions attempt to stimulate a student's inherent desire or motivation to change risky behavior (TFNACAAA).

In typical interventions using these techniques, established instruments assess student alcohol consumption. An assessor scores results and students receive nonjudgmental feedback on their personal drinking behavior in comparison with that of others and its negative consequences. Students may receive such feedback in the context of motivational enhancement and may receive cognitive-behavior-based suggestions for managing their decisions to change. Several meta-analytic and narrative research reviews suggest that this combination of three strategies is effective in reducing consumption (Larimer & Cronic, 2002). Much of this area of research of interest has roots in motivational interviewing.

Motivational Interviewing Interventions Background

Miller and Rollnick (2002) define Motivational Interviewing (MI) as a client-centered,

directive method for enhancing intrinsic motivation to change by helping people explore and resolve ambivalence. The approach is client-centered in that each person has inherent capability and responsibility for making choices on how to change their own behavior. The counselor only works to clarify and amplify the client's concerns about behavior and the client is responsible for making the choice to change or not. MI is directive in that the counselor has an objective in mind (i.e., behavior change) and steers the conversation in that particular direction using questions to amplify and expectantly resolve the mixed feelings (ambivalence) an individual may have about change. MI encourages individuals to decide to change for themselves by using empathy and warmth rather than confrontation. When ready to discuss change strategies, counselors can also assist individuals by helping them establish specific goals, providing a menu of behavior change options, and building skills and confidence necessary for modifying their drinking behavior (Miller & Rollnick, 2002).

In order to simplify the process and reach larger numbers of individuals researchers developed Brief Motivational Enhancement Interventions, which incorporate the spirit and philosophy of MI, based on these MI principles. Specifically, Brief Motivational Enhancement Interventions (BMI's) developed for use in a single, approximately 40-minute, session (Rollnick, Heather, & Bell, 1992) can be delivered individually or in small groups to reduce alcohol consumption and/or the associated negative consequences. In this context, BMIs derived from the counseling style of MI are designed for nondependent drinkers. They focused exclusively on increasing their motivation to change behavior by providing educational information about alcohol while using non-confrontational strategies, frequently based on MI, to increase motivation for change (Miller & Rollnick, 2002). The non-confrontational and non-judgmental style is well suited for many individuals, including college students, who can be defensive about drinking and who do not respond well to suggestions that they have a drinking problem. Accordingly, the process reduces stigma associated with labeling people as problem drinkers or abusers (Marlatt, Larimer, Baer, & Quigley, 1993). Brief interventions generally aim to moderate

a person's alcohol consumption to sensible levels and to eliminate harmful drinking practices (such as binge drinking) rather than insisting on complete abstinence from drinking, although abstinence may be encouraged where appropriate (Moyer & Finney, 2004).

One important component of BMI is "developing discrepancy" which involves making individuals aware of a disparity between their actual and their desired behavior, or between ongoing behavior and educational and life goals, and which encourages a behavior change through our motivation to reduce such discrepancies (Miller & Rollnick, 1991). Frequently, such discrepancy develops by giving individuals normative context in which they may consider their own, presumably discrepant from "normal" behaviors. Theoretically, when individuals feel that, there is a gap between where they are and where they would like to be (or where most people are), motivation for change increases. Among college students, these discrepancies typically include relative consumption patterns or how alcohol is affecting, or could affect, their schoolwork, health, or relationships in ways that are inconsistent with other aspects of their life.

When individuals become cognizant of a gap, and gain increased awareness that the nature and impact of the behavior may be problematic, self-evaluation and self-regulatory process aimed at reducing discrepancies are engaged (Neal & Carey, 2004). Cognitive and negative affective (i.e., emotional) reactions to the detection of such discrepancies are what direct change as the individual attempts to reduce the associated negative affect by reducing the behavioral discrepancy (Neal & Carey). This formulation, made in the context of alcohol consumption, is consistent with more general discrepancy-reduction theories in social psychology, including cognitive dissonance theory (Festinger, 1956) and self-discrepancy theory (Higgins, 1989).

Theory and Rationale behind Brief Personalized Normative Feedback Interventions for Alcohol Use

As mentioned, one common method widely used for developing discrepancy in brief alcohol interventions is Personalized Normative Feedback (PNF). PNF's design is to help

correct misperceptions and myths related to high-risk drinking, such as perceptions of the normative nature of heavy drinking (Perkins, 2002). It is also individually oriented in order to facilitate change in individual drinking behavior. PNF applied in the college population strives to develop discrepancies between student's beliefs and behaviors relative to actual campus norms in order to create cognitive dissonance and subsequent reductions in problematic alcohol use. In PNF, discrepancy is developed by making the level of consumption and consequences of one's drinking salient to the individual providing a context with which to evaluate the relative excessiveness of one's drinking and emphasize inconsistencies between his/her consumption and peer consumption. The basic idea being, if one receives information about his or her drinking habits, alcohol-related problems, and perceptions of drinking norms, and they receive normative data regarding how they rank relative to others, individuals will have a normative context in which they can reconsider their own drinking patterns. They will then notice the difference between their current behaviors and normative standards, thereby motivating discrepancy-reducing processes that reduce drinking risks (Collins, Carey, Sliwinski, 2002; Borsari & Carey, 2005).

One explicit goal of normative feedback is to alter and correct misperceptions about peer use norms and alcohol expectancies (Dimeff, Baer, Kivlahan, & Marlatt, 1999). This function stems from the consistent findings that students' perceptions of what is normal (i.e., statistically modal or average) are exaggerated (Lewis & Neighbors, 2004; Borsari & Carey, 2003). Specifically, students tend to over-estimate the generality, frequency, and acceptability of heavy drinking by peers and the amounts of alcohol that other students drink (Borsari & Carey, 2003), most likely because they spend considerable time with people similar to them, whom also drink heavily. As such, PNF interventions are designed to counteract such misperceptions and correct exaggerations of normative binge drinking by providing students with accurate normative data derived from the entire spectrum of college students or population-based samples of similar-aged peers (Neighbors, Lewis, Bergstrom, & Larimer, 2006; Neal & Carey, 2004).

In practice, PNF involves providing individuals with a summary of individual, personalized data obtained from responses to self-reported items from various alcohol-related instruments. The instruments assess individual drinking patterns, alcohol-related problems, personal risk factors, peer norms, one's own perceptions of others drinking, and data regarding others actual drinking (Neighbors, Lewis, Bergstrom, & Larimer, 2006; Neighbors, Larimer, & Lewis, 2004; White, 2006). Structured "feedback forms" provide comparisons of individual responses to normative data wherever possible. Feedback components typically include information summarizing one's own drinking patterns, experience of alcohol related consequences, risk factors such as family history, feedback regarding alcohol expectancies (beliefs about effects of alcohol), and moderation strategies. Overall, such feedback allows recipients to consider the similarities between his/her drinking behaviors and normative drinking behaviors.

As described in detail above, the discrepancy-reducing/self-regulation model posits that, when provided normative standards that indicate our own behaviors are deviant from the norm, people will be motivated to take corrective action to bring behaviors in line with new, perceived norms. Therefore, researchers hypothesize that just providing feedback, as opposed to embedding the feedback in a brief motivational intervention, is sufficient to produce significant behavior change (Agostinelli, Brown, & Miller, 1995).

In the college population, a key assumption of presenting feedback regarding an individual's drinking patterns relative to others is that students care about how they compare with their peers (Neighbors, Larimer, & Lewis, 2004) and will be motivated to change. Supporting this assumption is considerable research showing that providing accurate norms about the drinking of others on campus can motivate a student to reduce his/her drinking (Neighbors et al., 2004) and is sufficient to cause arousal of negative affect and instigation of discrepancy-reducing changes in drinking behavior (Neal & Carey, 2004). Overall, research has shown that PNF is perhaps the more important component in BMI aimed to curb at-risk drinking

in the college population (Baer, Kivlahan, Blume, McKnight, & Marlatt, 2001; Marlatt et al., 1998) and there is good evidence to show that PNF interventions without MI can lead to short-term drinking reductions (Collins, Carey, Sliwinski, 2002; Murphy, et al., 2004; Mun, White, & Morgan, 2009; Walters, Bennett, & Miller, 2000; White, Mun, Morgan, 2008).

In this literature, PNF interventions are a form of brief interventions; however, they should not be confused with the MI counseling style used in brief motivational enhancement interventions. PNF interventions focus less on increasing one's intrinsic readiness for change (motivation) and more on providing normative feedback (developing discrepancy), even if the latter may indirectly affect the former. Although, PNF interventions, sometimes conducted within the context of a BMI, are more flexible in terms of delivery. Specifically they can be delivered in person (individually or in groups), or by mail, handout, or computer.

Studies Evaluating the Effectiveness of PNF Interventions.

The purpose of this section was to review the literature examining the efficacy of PNF interventions (although similar approaches were reviewed as well). An additional goal is to compare the relative effectiveness of various delivery modes such as in person, by mail, by handout, or by computer. Several meta-analytic and narrative reviews provided the basis for this investigation. Reviews included here investigated at least some studies with PNF as a main component. The literature review yielded two meta-analyses (Carey, Scott-Sheldon, Carey & DeMartini, 2007; Riper, Straten, Keuken, Smit, Schippers, & Cuijpers, 2009) and five review studies (Elliot, Carey, & Bolles, 2008; Larimer & Crounce, 2002; Larimer & Crounce, 2007; Walters & Neighbors, 2005; White, 2006).

Meta-Analyses

Overall, the two meta-analyses showed that brief interventions that included PNF, MI, or both, were more effective than those that do not include those features. In the first, Carey, Scott-Sheldon, Carey, and DeMartini (2007) conducted a meta-analysis of all known forms of alcohol prevention interventions with college students to clarify the status of the efficacy

literature of the time. Researchers initiated the meta-analysis based on the increasing number of publications in the previous decade. Their aim was to examine intervention effects across 62 studies to characterize the effectiveness of various interventions for college student drinkers across outcomes and follow-up intervals. To be included, published and unpublished studies must have had (a) the aim of reducing alcohol use and/or consequences, (b) random assignment to intervention or control conditions, and (c) reported behavioral outcomes related to alcohol consumption and or alcohol-related problems. Comparisons included individual-level interventions versus group interventions and interventions that used delivery by a facilitator or computer or print delivery. In addition, intervention delivery educated by theory or guided by manuals compared to interventions using motivational interviewing, or PNF via computer. The majority of intervention components included BAC education, normative comparisons, alcohol consumption, problems and expectancies feedback, moderation strategies, and goal setting.

The study reported between group effects, not within group effects, calculated as mean differences between the treatment and control group at follow up divided by the pooled standard deviation. The researchers calculated effect sizes for a number of alcohol consumption outcomes including, quantity consumed over time, on specific occasions, and on a single occasion, frequency of heavy drinking and drinking days, peak blood alcohol concentration (BAC), composite alcohol consumption, and alcohol-related problems.

Overall effect size findings for immediate (≤ 3 weeks) and short-term (4-13 weeks) follow-ups indicated that intervention participants reduced their quantity of drinking ($d = 0.19$; $d = 0.13$), their frequency of heavy drinking ($d = 0.17$; $d = 0.18$), and their peak BAC ($d = 0.41$; $d = 0.13$) respectively, compared to control participants. Results for the short-term follow-up also showed reduced quantity for specific time drinking days ($d = 0.13$) and for alcohol-related problems ($d = 0.15$), both relative to controls. Results for intermediate (14-26 weeks) follow-up reduced quantity of alcohol consumed ($d = .11$) and frequency of heavy drinking ($d = .11$), again relative to controls. They also showed the biggest effect for reductions in alcohol-related

problems ($d = .22$). Long-term (approximately 6 months) follow-up showed similar patterns of significant reductions in frequency of drinking days ($d = .16$) and in alcohol-related problems ($d = 0.14$) compared to controls. Cohen's d (1992) suggests that effect sizes of .20 are small, .50 are medium, and .80 are large.

The authors reported that individual level alcohol interventions reduced alcohol use and alcohol-related problems more than group interventions and that brief interventions based on motivational interviewing and normative feedback were more effective than those without, however, they did not report effect sizes for these latter comparisons. Interestingly, the study found effect size magnitude of consumption (quantity, heavy drinking frequency, and peak BAC) were not always prolonged, with many relinquishing over longer-term outcomes (e.g., six months). In contrast, reductions in alcohol-related problems emerged later and continued into long-term follow-ups.

Unlike Carey et al.'s., (2007) general review, Riper, Staten, Keuken, Smit, Schippers, and Cuijpers (2009) specifically examined the effectiveness of brief single-session PNF interventions without therapeutic guidance (i.e., use of a professional counselor) among various populations. Their literature search identified fourteen randomized control studies that the researchers examined for their overall effectiveness in reducing frequency or quantity of alcohol consumption. Published and unpublished studies included must have (a) applied a randomized control design with control group, (b) reported data useable for meta-analytic procedures, (c) assessed alcohol-drinking behavior (frequency or quantity) as a primary outcome, (d) applied individually focused personalized feedback interventions, and (e) delivered the intervention without therapeutic support.

The study reported effect sizes calculated by subtracting, at post-test, the average score of the control condition from the average score of the experimental condition and dividing the result by the average of the standard deviations of the experimental and control conditions. Results indicated that PNF interventions for problem drinkers were more effective than non-PNF

interventions in reducing problem drinking with an overall average effect size of 0.22. Like the Carey et al. analysis, this study observed a need for research on the long-term effectiveness of PNF interventions on measures of consumption (i.e., 1 month vs. 9mos; the study did not examine alcohol-related problems). However, they concluded that brief single-session PNF interventions were as effective as multi-component personalized feedback across settings, target groups, and over time and a variety of delivery modes. Moreover, their review noted that these forms of interventions were practical and cost-effective in reducing high risk drinking in young and adult problem drinkers, and cost effective in view of the minimal time and financial investments needed to make them widely available. Specifically, web-based delivery showed advantages of widespread availability too difficult to reach college students and female problem drinkers and they are continuously available and more readily accepted.

Both meta-analyses showed that brief interventions based on PNF or motivational interview are more effective than those that do not include those features. Carey et al (2007) confirmed that interventions providing feedback and normative comparisons are worthwhile in reducing hazardous drinking among college students. Riper et al (2009) agreed and further suggested that these interventions were viable in general populations. In addition, both found individual interventions to be more effective than group interventions and the studies are similar regarding the longevity of effects for reducing consumption.

Narrative Reviews of the Literature

In addition to the meta-analysis described above, several narrative reviews of the literature have also investigated the effectiveness of alcohol interventions among college students. Although, all reviews concluded that PNF interventions are effective in reducing alcohol consumption in this population, all reviews further agreed that the literature is in need of more research on the long-term effectiveness of brief interventions for alcohol risk reduction.

Elliott, Carey, and Bolles (2008) examined the literature concerning the growing popularity of electronic health interventions (e-interventions). Specifically these are brief

feedback based alcohol interventions administered via computer designed to reduce college drinking. This form of intervention is popular because the internet allows for rapid and widespread distribution of information and can reach large numbers of individuals. E-interventions can also be custom designed to (a) maintain anonymity, (b) create an environment conducive to disclosing alcohol-related behavior, (c) use multi-media effects to make interventions engaging and appealing, and (d) they can collect information and use the information to tailor content. The review evaluated the efficacy of 117 randomized control trials published as of August 2007.

Overall, researchers found support for the use of e-interventions for the reduction of risky college drinking. However, they could not compare the efficacy between the various computer-based interventions because no two studies were equivalent. However, the findings did suggest that computer based interventions using PNF were most effective. They also suggested that such interventions might be suitable for students who have low motivation to change, who may respond better to information on the web. Unfortunately, and similar to the meta-analyses, overall significant reductions were mostly evident only in the short-term (< 6 months) in reducing alcohol consumption and dissipated at longer term follow-ups and alcohol-related problems were not always assessed.

Dissimilar to Elliot et al.'s (2008) finding suggesting the effectiveness of computer-based interventions, Larimer and Cronce's (2002) review supported the efficacy of mailed feedback interventions. Specifically, they reviewed and assessed the existing body of literature on individually focused prevention and treatment approaches for college students. They included 32 published and unpublished studies from the period of 1984-1999. Studies were included if (a) they had control and comparison conditions, (b) at least one outcome measure focused on behavior change in drinking or consequences, and (c) if nonrandomized they employed pre- and post-test assessments allowing for statistical control of selection bias.

They grouped studies into one of three categories of programs including

educational/awareness programs, cognitive/behavioral programs, or motivational enhancement programs. Educational/awareness programs aimed at increasing knowledge regarding the negative effects of alcohol to decrease use. Cognitive/behavioral programs also incorporate information but did so in the context of teaching skills to modify beliefs or behaviors associated with high risk drinking. Lastly, motivational enhancement programs provided motivational interviewing and/or personalized feedback.

Educational/awareness approaches at the time of this review were most commonly utilized techniques for individually focused prevention on college campuses. Specifically the researchers evaluated three types of educational program, traditional information or knowledge-based programs, values clarification programs, and normative reeducation. Neither the traditional knowledge base programs nor the values clarification programs provided support for their efficacy. The normative reeducation programs, based on two studies, produced mixed results with only one finding support for normative reeducation, showing greater changes in perceptions of norms than controls. Overall, the reviewers concluded that continuing to pursue approaches based solely on informative or awareness models is a poor use of resources on college campuses.

Similarly, three subcategories of skills training programs emerged, specific alcohol-focused skills training, multicomponent alcohol skills training, and general life skills training. Specific alcohol-focused skills training programs provided support for the role of repeated assessments without intervention in promoting change suggesting the opportunity to respond to questions about drinking and negative consequences in the absence of any additional feedback can serve as an intervention for those in repeated assessment conditions. Both the multicomponent and global life alcohol skills training approaches proved to be generally efficacious in producing some effects on alcohol consumption, problems, or both. In summary, these approaches generally have stronger research designs than educational programs and yield greater support for their efficacy, but methodological limitations are evident due to small

samples and high attrition rates.

Overall, motivational enhancement programs showed significant effects on drinking behavior, problems, or both and have proven efficacious in a variety of contexts. Among the eight motivational enhancement programs, they found strong support for the efficacy of normative feedback, delivered individually or in groups, and delivered in a variety of contexts. Among studies including PNF components, all found significant effects on drinking behavior, consequences, or both. Further, the review supported the efficacy of mailed feedback interventions. Unfortunately, again it was noted that all studies were limited by relatively short-term (<6 months) follow-up.

In a second review, Larimer and Cronce (2006) updated their prior review of the literature to cover the period from late 1999 to 2006 on individually focused prevention and treatment approaches for college drinking. Inclusion criteria remained the same. This review included an additional 42 studies that had been published since 1999, 11 with a PNF component provided evidence in support of interventions incorporating personalized feedback. Findings were mostly the same as prior findings. The study reviewed the three same major categories of programs and concluded educational/information-only techniques are not efficacious for changing drinking or problems, values clarification programs showed no effects on behavioral outcomes, and cognitive/behavioral skills programs as a whole showed reductions in drinking for men only, but suffer significant methodological limitations and concluded not efficacious. Findings indicated normative interventions as efficacious in modifying both behavioral and attitudinal normative perceptions and interventions including PNF as a stand-alone intervention or encouraging participants to compare personal drinking to the norms have shown better efficacy than generic normative re-education content, and gender-specific normative feedback showed to be more efficacious for women. Moreover, the review found the strongest support for BMI for college drinking especially when researchers incorporated PNF. In addition, research continues to support mailed or computerized feedback

in the absence of any in-person intervention. Overall, the review reinforced the notion that interventions are most useful when PNF is an included component.

Walters and Neighbors (2005) reviewed the literature on published studies using feedback as a major component of alcohol interventions among college students to examine the evidence for different feedback formats to make recommendations for future research. The thirteen studies included must have consisted of a control and a comparison group and assessment of drinking behavior at one or more follow-ups. This review supported the efficacy of all forms of feedback-based interventions for significant reductions in drinking as compared to control or comparison groups. Specifically, 11 of the 13 studies reviewed showed significant reductions in drinking as compared to controls. This review also concluded mode of delivery did not matter (i.e., interview, mail, or computer). They noted that studies varied widely across all areas (e.g., population, delivery) but regardless feedback interventions consistently changed normative perceptions of drinking and the addition of a counseling session did not appear to increase the impact of the feedback. Further, as similar to other reviews clear effects at 6 weeks were less evident at 6 months among most studies.

Finally, a review by White (2006) extended Walters and Neighbors (2005) study by adding four studies of mandated students and two more published since to evaluate PNF interventions for reducing the harm associated with alcohol abuse among college students. Inclusion criteria consisted of only studies of a randomized design. They evaluated 17 studies specifically to describe the rationale for PNF interventions for college students and to summarize evaluations of the interventions. They found that PNF interventions were efficacious for reducing alcohol use and related negative consequences and in person interventions were not superior to written feedback, mailed, or computer feedback. Overall, they concluded written and computer based personalized feedback interventions were more favorable than face-to-face individual or group interventions because they are as efficacious as the latter and easier and less costly to implement.

In summary, all review studies included here, including two meta-analyses and five narrative reviews, supported brief PNF interventions in reducing alcohol consumption among college students. Three studies concluded that the effectiveness of personalized feedback may not depend on personal contact but on the content of the feedback (i.e., normative) and the mode of delivery (i.e., mailed or web-based; Riper et al, 2009; Larimer & Crounse, 2002; White, 2006). In addition, all reviews coincide that there is a need for more research on the long-term effects (> 6 months) of brief personalized feedback interventions for alcohol risk reduction.

Overall, the literature on individuals receiving brief PNF proves to be quite promising, at least in the short term. Individuals receiving personalized feedback regarding their own drinking and peer norms tend to reduce drinking more than those who do not receive such feedback. To date, this finding proves true regardless of what form of feedback is present. The above-mentioned reviews served as a basis in identifying studies for inclusion in a further evaluation of the literature. Studies included in the more in-depth review consisted of brief PNF interventions with a primary outcome of reducing alcohol use and/or alcohol-related problems. All forms of feedback were included (e.g., mailed, face-to-face). In addition, for the purpose of the investigation, a brief intervention was defined as <30 minutes.

Additional Trends in Review of Individual Studies

An evaluation of the individual studies included in the above-mentioned reviews revealed three additional trends (see appendix A for a complete narrative review of these studies). These three trends included the use of motivational interviewing, the effectiveness of PNF for reducing alcohol-related problems vs. consumption per se, and the effectiveness of gender-specific feedback.

Use of motivational interviewing. One common theme found was testing the efficacy of PNF alone or in combination with an additional motivational interviewing component. Motivational interviewing (MI) is frequently combined with PNF in interventions because it is supposed to help people resolve their ambivalence and move toward healthy change with the

assistance of a counseling session and has been proven efficacious in reducing alcohol consumption and alcohol-related problems among college student drinkers (Dimeff, Baer, Kivlahan, & Marlatt, 1999). Several studies compared the efficacy of brief PNF interventions (approx 15 min) to normative feedback interventions with an additional motivational component (30-60 minutes) to see if the MI component produced greater change than PNF alone.

Specifically, five studies compared PNF interventions alone or in combination with a MI component. All studies found that the addition of an MI session did not increase the efficacy of the program on outcomes such as the quantity and frequency of alcohol consumption, drinking to intoxication, peak consumption, alcohol-related problems, and heavy episodic drinking (Butler & Correia, 2009; Dumas & Hannah, 2008; Murphy, Benson, Vuchinich, Deskins, Eakin, Flood, et al., 2004; Mun, White & Morgan, 2009; Walters, Bennett & Miller, 2000). Thus, all studies provided evidence that a relatively simple PNF intervention delivered without a counseling session was equally effective as the more intensive intervention. Further, given the minimal cost and potential for reaching large populations standalone personalized drinking feedback is a promising intervention that merits continued study (Murphy et al., 2004).

Alcohol-related problems. Another common outcome across some studies was examining reductions in alcohol-related problems vs. consumption per se. As described above, heavy drinking is associated with multiple social and interpersonal problems such as arguing with friends, engaging in unplanned sexual acts, drinking and driving, academic difficulties, unintended injuries, even assault and death (Vik, Corrello, Tate, & Field, 2000). As such, several studies examined whether and how PNF affected experience of alcohol-related problems. Unfortunately, the majority of studies investigating alcohol-related problems found short-lived (< 6 months) reductions.

Six studies found reductions of alcohol-related problems in the short term (Butler & Correia, 2009; Collins, Carey & Sliwinski, 2002; Dumas, McKinley, & Book, 2009; Mun, White & Morgan, 2009; White, Mun, Morgan, 2008; Walters, Bennett, & Miller, 2000) that were no

longer evident at longer follow-up. Two of the studies finding reductions were non-significant (Doumas, McKinney, & Book; Walters, Bennett, & Miller). While, half of these studies showed significant reductions among mandated students, as such, the effects could be a result of being caught and mandated (Doumas, McKinney, & Book ; Mun, White & Morgan; White, Mun, Morgan). Lastly, one study finding reductions found reductions among controls as well. The four studies with no findings were Geisner, Neighbors, Lee & Larimer, 2007; Murphy, Benson, Vuchinich, Deskins, Eakin, Flood, et al., 2004; Neighbors, Lewis, Bergstrom, & Larimer, 2006; and Lewis, Neighbors, Lee, & Oster-Aaland, 2008. Among the four studies not finding reductions in alcohol-related problems, all used recruited students.

This finding among recruited students is consistent with that of Carey, Scott-Sheldon, Carey, & DeMartini (2007) who found that PNF interventions were less successful in reducing problems when they targeted heavy drinkers or high-risk groups. The authors noted students may be more likely to have heavier drinking peers or higher alcohol involved social networks, or they note the literature may suggest high-risk groups may serve functions different from drinking in the general student population requiring tailored interventions that address deeper structures. Although they did find interventions providing feedback on expectancies or motives and normative comparisons to be more successful the finding is not consistent here. No other meta-analysis or review discussed findings related to alcohol-related problems. As such, although researchers suggest a need for further study, it appears that PNF interventions are equally or less successful at reducing problems than they are at reducing actual alcohol consumption.

Gender specific feedback. A few studies investigated the use of gender-specific feedback in changing perceived norms and reducing alcohol behaviors. The rationale for this is that if norms are more specific (i.e., gender-specific) they should be perceived as more relevant and therefore be more influential. This is thought to be especially true when taking a descriptive norms approach as is done with PNF. Both Lewis and Neighbors (2007) and Lewis, Neighbors, Oster-Aaland, Kirkeby and Larimer (2007) compared gender specific normative feedback and

found results to be a little stronger and more consistent in the gender-specific feedback groups, especially among women. Both studies concluded there was some promise to gender-specific feedback although there is a need for more research. Saitz, Palfai, Freedner, Winter, MacDonald, Lu, et al., 2007; Mun, White, & Morgan, 2009; & Murphy, Benson, Vuchinich, Deskins, Eakin, Flood, et al., 2004 did not provide gender specific information but conducted separate gender analysis and found significantly greater reductions of alcohol use and/or alcohol-related problems among females. Females had particularly greater increases in readiness to change and men in intention to seek help. They further suggest future studies consider the gender specific results in future hypothesis generating. Overall, although promising, there is a need for more research to establish the efficacy of gender-specific feedback in reducing alcohol use and changing normative beliefs as some studies suggest PNF may be more efficacious for females.

Conclusion

This review examined several meta-analyses and reviews of the literature evaluating the efficacy of PNF and related interventions. As noted, the majority of studies found interventions which provide students with PNF regarding their alcohol use to be efficacious as an indicated prevention or intervention aimed at those already at risk for drinking problems (Larimer & Cronce, 2002; Walters & Neighbors, 2005). Although there is some conflicting information, interventions were not as useful for alcohol-related problems when using recruited students or written or mail forms of feedback. Overall, however, providing PNF to at-risk drinkers can reduce their alcohol consumption at least in the short term (≤ 6 months).

Despite their effectiveness, several issues remain. First, relative effect sizes, though significant, are small (e.g., .22) and tend to diminish over time. This suggests that reductions in drinking are reliable, but fairly small. Moreover, such an effect size may indicate that not all higher risk drinkers may benefit from PNF interventions.

Second, it is still not clear as to what mediating mechanisms are responsible for

producing the efficacious nature of PNF interventions. Theoretically, as discussed above, researchers theorize the receipt of PNF is what may arouse discrepancies between actual and desired states, discrepancies that increase negative affect and which people are motivated to reduce, primarily by changing their behaviors rather than altering their self-perceptions. Normative feedback is important in this regard because risky drinkers have developed a false consensus regarding the “normalcy” of their own drinking behavior—primarily because they tend to affiliate with other heavy drinkers. The presentation of accurate norms, and comparisons of self to them, produces the motivating discrepancy.

To date, only a few studies have examined mediation of PNF effects with the majority of studies examining mediation effects focused primarily on perceived descriptive norms about alcohol use (e.g., comparing individual drinking levels to campus norms; Borsari & Carey, 2000; Lewis, Neighbors, Oster-Aaland, Kirkeby, & Larimer, 2007; Neighbors, Larimer & Lewis, 2004; Neighbors, Lewis, Bergstrom, Larimer, 2006; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Williams, Herman-Stahl, Calvin, Pemberton, & Bradshaw, 2009; Tomaka, Morales-Monks, & Shamaley, 2012). There is a dearth of literature examining other possible mediation effects including alcohol expectancies, readiness to change, and coping strategies. Indeed only two studies have examined these latter factors (Neighbors et al., 2007; Williams et al., 2009) with neither study finding any mediation effects for factors other than descriptive norms.

Finally, PNF interventions appear less impactful for reducing alcohol-related problems. As described above, the studies of alcohol-related problems have suggested that PNF has small to limited impact or even a late impact on problems. There are several possible reasons for this. First, among those participating in PNF interventions, baseline rates of alcohol-related problems tend to be less than they are for alcohol consumption, per se. This is expected as most studies use alcohol-consumption levels or patterns as entry criteria (e.g., at least one heavy-drinking episode, at least two binge episodes) rather than experience of problems. This reflects the fact not all heavy drinking college drinkers have experienced significant or even any

problems, at least not yet.

Another reason may be the short length of typical follow up. As suggested by the Riper et al. (2009) meta-analysis, perhaps interventions need more time to observe effects on problems. As such, alcohol-related problems may diminish only after drinking reductions have been maintained for some time (Murphy et al., 2004; Mun, White, Morgan, 2009). Second, perhaps other individual characteristics or variables (e.g., sensation seeking or coping) may play a role in problems, rather than consumption per se, and changes in such variables are unlikely following brief interventions designed primarily at changing descriptive normative beliefs regarding drinking levels.

Finally, it is possible that the experience of alcohol-related problems, or experience of any problems, is related to how people cope with stress (Lazarus, 1999). As alluded above, it is possible that the addition of coping feedback will enhance the effectiveness of PNF interventions, as specific coping information would be a central mechanism of behavior change for those receiving such interventions, thereby allowing such interventions to target alcohol-related problems more effectively. Although the majority of college students report drinking for social reasons (Kuntsche, Knibbe, Gmel, & Engels, 2005) drinking to cope with negative emotional states has been found to be particularly associated with alcohol-related problems (Cooper, Frone, Russell, & Mudar, 1995; Kuntsche, Knibbe, Gmel, & Engels, 2005). In Kuntsche's review of drinking motives among college students, they found among U.S. College students heavy drinkers indicate more motives than moderate drinkers do. As such perhaps a coping component to PNF may increase the effectiveness for those students in particular, as previously noted PNF interventions seem better suited for lighter drinkers.

Small effect sizes and limited impact on alcohol-related problems suggests that researchers should focus on ways of increasing the impact of PNF interventions on consumption and alcohol-related problems. Accordingly, despite consistent support for brief forms of interventions, perhaps additional components targeting specific risk factors or

motivations for drinking might enhance the efficacy of these interventions. In this vein, considerable research has found that a common motive underlying alcohol use among college students is coping with stress. Indeed, drinking as a means of coping with stress has been closely linked with the development of high-risk drinking (Baer, 2002) and particularly alcohol-related problems (Cooper, Frone, Russell, & Mudar, 1995; Kuntsche, Knibbe, Gmel, & Engels, 2005).

As previously stated, Carey, et. al., found that PNF was not as effective for heavy drinkers; this may be in part due to the discovery that heavy drinking has been particularly likely among people who experience stress and drink for coping motives (Abbey, Smith, Scott, 1993). Moreover, traditionally, reasons for drinking alcohol have been grouped into two broad categories (a) drinking to be sociable, celebrate, having a good time, etc., or (b) drinking to cope, to escape, or to avoid negative unpleasant emotions (McCarty & Kaye, 1984; Smith, Abbey, Scott, 1993). Several other studies have found the latter, coping motives to be associated with heavy drinking (Cooper, Agocha, & Sheldon, 2000; Labouvie & Bates, 2002; Montgomery, Benedicto, & Haemmerlie, 1993) and particularly associated with alcohol-related problems (Cooper, Frone, Russell, & Mudar, 1995; McNally, Palfai, Levine, & Moore, 2003; Simons, Correia, & Carey, 2000). Therefore as outlined in detail below, adding a coping component to typical PNF interventions may increase their ability to reduce consumption as well as increase their ability to affect alcohol-related problems.

Theory and Rationale behind Coping as an Added Component to Brief Personalized Normative Feedback Interventions for Alcohol Use

Much research to date supports a coping motives-alcohol link. For example, several studies among college students confirmed that coping motives positively related to typical frequency and quantity of alcohol consumption, heavy drinking, and alcohol problems (Cooper, 1994; Montgomery, Benedicto, Haemmerlie, 1993; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007). Cooper, Frone, Russell, and Mudar (1995) further established that coping motives were

more proximal determinants of alcohol consumption and related problems than negative mood states thought to underlie coping drinking among adolescents and adults. In addition, stress has been linked to a propensity for alcohol use in a number of studies (Wagner, 1993; Brady & Sonne, 1999; Perkins, 1999; Fager, 2004). Overall, research among college students' supports the notion that life stress is an important risk for alcohol use in general (Hutchinson, Patock-Pexkham, Cheong, & Nagoshi, 1998) and that alcohol may serve as a coping function thereby used to increase positive affect and/or decrease negative mood (Shiffman & Wills, 1985).

Although the stress, coping, and alcohol use literature is considerable, three studies in particular found significant direct correlations of coping to alcohol in the context of PNF interventions (Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Tomaka, Morales-Monks & Shamaley, 2012; and Williams, Herman-Stahl, Calvin, Pemberton, & Bradshaw, 2009).

In the first, Neighbors et al. (2007) compared several variables as predictors of alcohol-related outcomes (consumption and problems) in a sample of 818 first year undergraduate students who reported at least one heavy-drinking episode in the previous month and who completed a baseline survey as part of participation in a PNF intervention. The researchers examined several factors that have been consistently associated with problem drinking in college student populations including demographic variables (i.e., gender & sorority affiliation), social norms (descriptive and injunctive), drinking motives (social enhancement, coping, and conformity), alcohol expectancies, and subjective evaluation of alcohol effects.

Overall, they found that descriptive and injunctive norms were significant predictors of consumption. In contrast, negative expectancies, favorable evaluations of negative alcohol effects and, coping motives were the best predictors of alcohol-related problems. They also assessed whether consumption mediated the relationships between these predictors and alcohol-related problems. Results indicated that consumption mediated relationships between fraternity/sorority membership, descriptive norms, and injunctive norms for friends. In contrast, injunctive norms for parents, coping motives, negative expectancies, and evaluation of negative

effects continued to predict independent variance in alcohol-related problems. The researchers suggest that these latter variables have direct relationships with alcohol problems not accounted for by variability in consumption. In particular, they noted that coping motives were the strongest predictor for alcohol-related problems, accounting for approximately half the variance and suggested that the data provide support for interventions directly targeting coping motivation. Specifically they recommend that the addition coping-related content may be of benefit to PNF interventions.

In a similar investigation, Williams et al. (2009) examined factors that may mediate the impact of PNF interventions on alcohol-related outcomes. Specifically they randomized 2470 military personnel to one of two web-based PNF interventions (i.e., the Drinker's Check-up (DCU), Alcohol Savvy (AS)) or a no-feedback control group. They also examined eight potential mediators including four categories of perceived descriptive norms (quantity, frequency, and alcohol motivational balance), concern about drinking (perceived risk and reasons to limit use), readiness to change and stress management (i.e., avoidant and active coping). At one and six-month follow-ups, the results showed significant direct effects for both programs for changing alcohol-related behaviors with reductions in the reported quantity of drinks, frequency of peers drinking (DCU) and reported number of same age peer drinking occasions (AS). The results also showed that many of the intermediate outcomes related to alcohol outcome variables, including perceived descriptive norms, positive and negative expectancies, and avoidant and active coping. Concerning mediation effects, however, perceived descriptive norms regarding consumption levels were shown to mediate the impact of the two PNF interventions. Regarding the coping scales, the researchers suggested that these variables did not mediate program outcomes primarily because the interventions do not address coping. Specifically, neither program included substantial content for how participants should cope with stressors in their lives. As such, consistent with Neighbors et al. (2007) they suggest refinement of programs to better target the constructs, which appear related to alcohol use in order to increase program

effectiveness.

Together, both studies suggest that adding coping to the intervention might improve the program's ability to affect consumption and problems as feedback. Since the correction of descriptive norms is a central mechanism of change in MI interventions, it is not unexpected that there would be a salient impact on norms and by extension alcohol use (Miller & Rollnick, 2002). The fact that coping does not mediate program impact is not unexpected either because, as previously noted, most PNF programs do not include content regarding how participants may cope with stress in their lives.

Finally, Tomaka et al. (2012), while not examining coping as a mediator of PNF intervention effectiveness, did examine coping as a mediator of relationships between types of self-esteem and drinking related outcomes. Specifically, they analyzed data on 402 college students voluntarily participating in an alcohol-risk reduction program. The researchers investigated the relationships of global and contingent self-esteem to stress and coping processes and alcohol consumption and related problems. The study had three specific aims, (a) to assess relations between types of self-esteem and alcohol consumption and problems, (b) to examine associations between global and contingent self-esteem and stress and coping behaviors, and (c) to examine whether stress and coping responses would mediate potential associations between global and contingent self-esteem and alcohol consumption and problems.

Results supported all three aims. First, they found that global self-esteem negatively related to alcohol-related outcomes (i.e., consumption and problems), whereas contingent self-esteem positively related to such outcomes. Second, several adaptive forms of coping (e.g., planning, acceptance) were associated with lower consumption and problems, whereas several forms of maladaptive coping (e.g., denial, substance use) were associated positively with these outcomes. Finally, perceived stress and substance use coping mediated the both effects of self-esteem on alcohol related outcomes. Thus, although not directly associated with mediation

of PNF effectiveness, this study demonstrates that stress and coping variables can mediate relationships between appropriate antecedent variables and alcohol outcomes.

Summary and Overview

Based on research citing the rationale for and effectiveness of PNF interventions, as well as studies suggesting and showing that coping variables might play an important role in alcohol-related outcomes and intervention research (Neighbors et al., 2007); the current study had two aims. The first was to examine whether the addition of a coping component to a PNF intervention could enhance its overall effectiveness as well as increase on alcohol-related problems and consumption. The second was to investigate the mediation of coping on PNF effects on alcohol-related outcomes. The first aim was based on research indicating the potential importance of coping in alcohol consumption and problems, the second aim was based on the premise that future research is needed on the effective components of alcohol interventions. In addition, there is a multitude of studies proving PNF effectiveness in alcohol use, but a dearth of studies examining the mediation of the intervention effect (Williams, Herman-Stahl, Calvin, Pemberton, & Bradshaw, 2009; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007).

In brief, the present study randomly assigned a sample of college students to one of three conditions (a) a standard PNF condition, (b) a standard PNF + PCF condition, or (c) a brief education only condition. Participants completed a pencil and paper battery of assessments of alcohol consumption, alcohol problems, drinking motives, social norms, and stress and coping. The study examined, (a) in particular whether PNF interventions with an added coping component had a greater impact on reducing alcohol risk levels, alcohol-related problems, and alcohol consumption than standard PNF alone and (b) whether coping mediated program outcomes when included as part of an enhanced PNF intervention.

Chapter 3

Method

This study examined whether the addition of a coping component to a PNF intervention could enhance its overall effectiveness in reducing alcohol-related problems and consumption in a convenience sample of college students. This study also examined whether changes in coping behavior mediated the impact of the enhanced intervention. Students were randomly assigned by classrooms to one of three conditions (a) a standard PNF condition, (b) a standard PNF plus coping condition, or (c) an education only condition. Experimental design necessitated that assignment to condition was at the classroom/group level. Due to the fact that the design necessitated that assignment to condition was at the classroom level low to moderate drinkers were included as were abstainers. As such, risk level was added to the statistical design to account for the fact that (a) PNF is an intervention designed for relatively higher risk students and (b) the procedures for the present study were such that the data included a large number of lower-risk drinkers and even a considerable number of non-drinkers.

Prior to the experience, all participants completed a battery of assessments of alcohol consumption, alcohol problems, motives, social norms, stress, and coping. Approximately 6 weeks after the experience, participants completed a follow-up survey that included the main dependent measures. The main hypotheses were that, (a) PNF interventions with an added coping feedback component would have greater impact on reducing alcohol-related problems than standard PNF interventions, (b) PNF interventions plus coping feedback would have greater impact on reducing alcohol consumption than standard PNF interventions, and (c) coping would mediate program outcomes when included as part of an enhanced PNF plus coping intervention.

Participants

Participants included a convenience sample of college students enrolled at The University of Texas at El Paso (UTEP) during the spring, summer, and fall 2011 semesters.

UTEP is a large, southwestern, minority-serving institution where over 77% of the students enrolled are Hispanic. UTEP is located on the U. S.-Mexico border, which offers unique academic, cultural, and research opportunities. Based on a power analysis (see below) approximately 336 participants were required to provide sufficient statistical power for the study. In the end, 583 were enrolled in the study and 501 completed all phases of the intervention

The primary inclusion criterion was that students had to be enrolled in classes at least part time at time of study enrollment. Exclusion criteria consisted of students under the age of 18. Referral criteria consisted of pregnant women, and individuals who experience problems of alcohol dependence. Women who reported being pregnant and who reported consuming alcohol, and individuals who scored a two or higher on questions 4, 5, and 6 on the Alcohol Use Disorders Identification Test (AUDIT; Babor, Biddle-Higgins, Saunders, & Monteiro, 2001) were retained in the study but also referred to the counseling center. While a cut-off score of a total of 20 or more on the AUDIT is usually used for referral to a specialist for diagnostic evaluation and treatment, the manual states that it may also be practical to review responses to individual questions dealing with dependence symptoms (i.e., questions 4, 5, 6). While, most college students may benefit from experiencing an intervention students of particular problems with dependence may need more assistance. One individual meeting audit criteria for dependence was referred to the University Counseling Center.

Instrumentation

Demographics Questionnaire. A brief demographic questionnaire assessed age, weight, gender, race, marital status, number of people living in the household, annual household income level and number of contributors, and country of residence. Students also provided classification and education level.

Rutgers Alcohol Problem Index (RAPI; White & Labouvie, 1989). The RAPI is a 23-item instrument that assesses the frequency of alcohol-related problems and situations experienced within the last month such as “not able to do your homework or study for a test,” and “got into

fights with other people (friends, relatives, and strangers).” Each item is accompanied by a four point scale of increasing frequency of occurrence where 0 = never, 1 = 1-2 times, 2 = 3-5 times, 3 = 6-10 times, and 4 = more than 10 times. The scale has shown good internal consistency reliability, $\alpha = .92$ (White & Labouvie, 1989). Further, the RAPI has shown good reliability in college student populations, $\alpha = .81$ (Borsari & Carey, 2000; Neal & Carey, 2004; Tomaka, Morales-Monks, Shamaley-Kornatz, & Thompson, in press).

Alcohol Use Disorders Identification Test (AUDIT; Babor, Biddle-Higgins, Saunders, & Monteiro, 2001). The AUDIT is a 10-item self-report instrument that assesses risky alcohol consumption and screens for potential alcohol-related problems. Items assess three specific content domains including hazardous alcohol use (e.g., frequency and quantity of drinking), dependence symptoms (e.g., impaired control over and increased salience of drinking) and harmful alcohol use (e.g., guilt after drinking, alcohol-related injuries; Babor et al., 2001). Items include "how often do you have a drink containing alcohol" and "how often have you failed to do what was expected of you because of drinking". Each item is accompanied by a five point frequency scale ranging from 0 = never to 4 = daily or almost daily. An individual's total AUDIT score reflects their level of risk related to alcohol.

Although typically assessed within the last year, the instrument used in this study will ask about alcohol consumption and behaviors within the past month. In a recent review of the AUDIT's psychometric properties across 18 studies, the overall reliability of the AUDIT was .83 with a range of .75-.97 (Reinert & Allen, 2007). In addition, the study concluded that the AUDIT's performance does not differ widely for various ethnic groups in studies using the English version.

Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985). The DDQ assesses quantity and frequency of alcohol consumption over the last month based on a typical week. Alcohol consumption is measured using a 7-day drinking calendar where participants are asked to think about a typical week during the last month and for each day record the number of

standard drinks they typically consumed on that day. This measure has been shown to be a reliable and valid indicator of drinking (Wolber, Carne, & Alexander, 1990; Miller et al., 2002). Participants are asked, "consider a typical week during the last three months, how much alcohol on average (measured in number of drinks) do you drink on each day of a typical week". Participants respond by reporting the number of drinks consumed on each day of the week, and weekly drinking is calculated by summing responses for each day of the week. Scoring of the DDQ produces three continuous measures of typical drinking: the average number of drinks per drinking day (quantity), the number of drinking days per week (frequency), and the highest drinking day overall (peak). The measure has demonstrated good test-retest reliability and convergent validity (Neighbors, Dillard, Lewis, Bergstrom, & Neil, 2006; Neighbors et al, 2004 & 2006).

Drinking Motives Questionnaire (DMQ; Cooper, 1994). The DMQ consists of 20 items assessing the frequency of drinking to achieve 20 motives along four factors. Cooper (1994) reports that the four factors each contain five items and include, social (e.g., "because it makes social gatherings more fun; $\alpha = .85$), coping (e.g., "to forget your worries" $\alpha = .82$), enhancement (e.g., "because it gives you a pleasant feeling"; $\alpha = .84$), and conformity (e.g., "because your friends pressure you to drink"; $\alpha = .84$). Items are rated along a five-point scale ranging from 1 = almost never/never to 5 = almost always/always.

Drinking Norms Rating Form (DNRF; Baer, Stacy, & Larimer, 1991). The DNRF consists of assesses individuals estimates of peer drinking. It is used to represent the discrepancy between the individual's perceptions of drinking norms and actual drinking norms (see Baer et al., 1991). The scale asks individuals to estimate the quantity and frequency of alcohol consumed each day of the week among their peers. Participants are asked such things as "how many drinks on average do you think a typical student at your college consumes on a given occasion". This scale has shown good reliability $\alpha = .76$ (Lewis & Neighbors, 2004).

Previous studies assessing college student perceptions of alcohol use have suggested

good face validity and predictive utility (Baer, et al., 1991; Kypri & Langley, 2003).

Comprehensive Effects of Alcohol Questionnaire (CEOA; Fromme, Stroot, & Kaplan, 1993). The CEOA is a 38-item self-report measure that assesses information concerning expected consequences of the consumption of alcohol. The expectancies scale measures ones beliefs regarding the likelihood of a potential outcome following the consumption of alcohol. The scale includes items addressing positive expectancies, negative expectancies, and valuations of various possible consequences of drinking. Positive expectancies include four categories of sociability, tension reduction, enhanced sexuality, and liquid courage. Negative expectancies include three categories of cognitive and behavioral impairment, risk and aggression, and self-perception. Sample items include, "I would be more outgoing" or "my body would feel relaxed". Participants indicate their degree of agreement. Each item is rated on a 4 point scale ranging from 1 = disagree to 4 = agree. Each outcome is also rated in terms of its subjective valuation assessing the degree to which one perceives the potential consequence to be bad or good. Each item is rated on a 5 point scale from 1 = bad to 5 = good. The scale has been shown to have adequate internal consistency, temporal stability, and construct validity (Fromme, Stroot, & Kaplan, 1993).

Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983). The PSS is a 14- item instrument that assesses overall stress levels by measuring the degree to which situations in life are appraised as stressful (Cohen et, al., 1983). The PSS is the most widely used psychological instrument for measuring the perception of stress. The scale is designed to compare individual's perceived stress related to current, objective events. Typical items ask about feelings and thoughts during the last month. Sample items include: "In last month, how often have you felt nervous and "stressed" or "In the last month, how often have you felt that you were on top of things". Each item is rated on a frequency scale from 0 = never to 4 = very often. The alpha reliability of the scale has been shown to be reliable at .85 (Cohen et al.).

COPE (Carver, Scheier, & Weintraub, 1989). The COPE is a 60-item, 15-subscale

instrument to assess coping. The assessment asks individuals to respond how they usually cope with items on a list of stressor experiences. Individuals are asked to respond to each item separately from other items on what they usually do when they experience a stressful event. Items are rated on a scale from 1 = I usually don't do this at all to 4 = I usually do this a lot. The COPE assesses areas across 15 scales including areas such as active coping, planning, humor, behavioral disengagement, denial, and substance use. The present tense "dispositional" or trait-like version in which respondents report the extent to which they usually do the things listed when they are stressed will be used at assessment. A time-limited version will be used at 6-weeks follow-up. This version of the COPE asks respondents to indicate the degree to which they have been having each response during a period up to the present. The time-limited version used will be present tense perfect (i.e., I have been). The reasoning for using both is to look at changes in coping over time. Initially, ways participants have coped in the past will be assessed and then how individuals have coped since the intervention.

Reliabilities have been reported for each of the 15 subscales. Cronbach's alpha coefficients range from .62 for active coping to .92 for turning to religion (Carver, Scheier, & Weintraub, 1989). Carver et al., (1989) test-retest reliabilities have also shown to be relatively stable ranging from .48 to .86.

Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1988). The BIDR is a 40-item measure used to measure the tendency to give socially desirable responses to tests. The BIDR includes two specific constructs of social desirability. The first, Self-Deceptive Enhancement (SDE), which is the tendency to give self-reports that are believed but have a positivity bias intends to capture the tendency to give honest but inflated self-descriptions reflecting an unconscious bias toward favorable self-portrayal. The second is Impression Management (IM), which deliberates self-presentation to an audience, involves conscious use of inflated self-descriptions, faking, or lying. Respondents are asked to rate items on a 7-point scale ranging from 1 = not true to 4 = somewhat true to 7 = very true, according to ones level of

agreement with the item. Respondents who give exaggeratedly desirable responses only attain high scores. Sample items include "I don't care to know what other people really think of me" or "I sometimes tell lies if I have to".

Internal reliability alphas for the total measures of self-deceptive positivity and impression management ranged from .81-.86 (Paulhus, 1988). Test-retest correlations over a 5 week period were reported as being .69 and .65 for self-deceptive positivity and impression management, respectively (Paulhus).

Manipulation checks. The post-test survey also contained two items that served as checks to see if individuals were sensitive to the information presented in the different conditions. Specifically one question asked "I remember receiving previous information on my alcohol consumption patterns", whereas a second question asked "I remember receiving previous information on my stress and coping patterns". Answers to both questions were in yes or no format. It was anticipated that individuals in either intervention condition would answer yes to remembering receiving feedback on their alcohol consumption patterns, whereas only individuals experiencing the coping intervention condition would answer yes to remembering receiving information on stress and coping patterns.

Power Analysis

Power analysis was based two criteria, the effect sizes of studies investigating alcohol-related problems among college students and on Cohen's d benchmark of effect sizes. Regarding the former, a meta-analysis by Carey, Scott-Sheldon, Carey, and DeMartini (2007) showed averaged weighted mean effect sizes for PNF interventions on alcohol-related problems to range from $d = .15$ at short-term follow-up (4-13 weeks), to $d = .22$ at intermediate follow-up (14-26 weeks), to $d = .14$ at long-term follow-up (27-195 weeks). Moreover, significant effects of short-term follow-up among alcohol-related problems showed moderate heterogeneity. Regarding the latter, Cohen (1992) suggests that effect sizes (d) of .20 are small, .50 are medium, and .80 are large; a small to medium effect would fall between .20 and .50.

Because the aim of the present study was to increase the effectiveness and impact of PNF interventions by including a component on coping with stress, the chosen effect size was $d = .35$ because it (a) represented a doubling of the standard effect found in meta-analyses of standard PNF interventions (i.e., $.17$ doubled resulting in an effect size of $.345$) and (b) an estimated small to medium effect size of $.35$ ($.20 + .50/2$) is a reasonable benchmark in Cohen's analysis. As such, it was anticipated that the addition of a coping component to a standard PNF intervention would boost the effect by double from a small effect to a small-medium effect. The G*Power 3 power analysis program was used to determine sample size (Faul, Erdfelder, Buchner, & Lang, 2009; Faul, Erdfelder, Lang, & Buchner, 2007). The program computed a sample size of approximately 306 (102 per group) for a given effect size of $d = .33$ with $.80$ power, and an alpha level of $.05$. In addition, a 10% attrition rate was estimated into the study making the total final estimated target sample 336. To ensure the total amounts of participants were included, study recruitment continued until it reached the desired number of participants. Data collection exceeded these projections. As described above 501 students completed all phases of the study.

Procedure

Design

The current study was a quasi-experimental design that randomly assigned groups of students to conditions, similar to an experimental pretest-posttest control group design. Most threats to internal validity were controlled through the random assignment of classrooms to groups.

Recruitment and Assessment

All procedures were conducted under the supervision of the UTEP Institutional Review Board (IRB). All students were required to provide informed consent prior to participation in intervention activities. The researcher and a research assistant(s) recruited students by visiting classrooms with professor approval. Participants were recruited to be in this study based on if

they attended classes on scheduled days of entry. All students attending classes on the date of entry were invited to participate in the intervention. The researcher or assistant administered the assessment battery to all voluntary students attending classes on the day of entry. The intervention occurred during the spring, summer, and fall 2011 semesters. Students agreeing to participate were either given class time, with instructor discretion, to complete a battery of assessments or were given the battery to take home and complete and return at the next class meeting. All students were eligible to participate if they self-reported they were not under 18.

The assessment battery included instruments for research purposes as well as instruments used to provide students with individualized feedback on their drinking patterns and beliefs relative to average or typical college students. All measures included as part of this report were collected prior to any intervention activities. Overall, the assessment battery took approximately 30 minutes and a similar shorter follow-up assessment occurred 6-weeks later. To encourage participation in all aspects of the study, all professors/instructors, with prior agreement, informed students that they would receive class credit following completion of all phases of the study. Students received class credit for their participation when instructors were notified of completion of all phases of the intervention.

The nature of the intervention procedures, described below, necessitated that assignment to condition occur at the group/classroom level. Classrooms were randomly assigned to either one of two intervention groups or an education only control group. They were randomly assigned by a random numbers table where values of 1, 2, 3 were assigned to the standard PNF condition, values 4, 5, 6 were assigned to the PNF plus coping condition, and values 7, 8, 9 were assigned to the education only condition. Zeros were skipped. The conditions are described in detail below.

Students agreeing to participate were told that the first part of study would involve completing a pencil and paper assessment to answer questions regarding their perceptions and behaviors regarding alcohol, stress, and coping. All volunteer participants were distributed a

packet containing an informed consent form and the assessment questionnaire. If professors allowed classroom time for completion participants were instructed to read and sign and date the informed consent and turn it in prior to completing the assessment questionnaire. A research assistant collected the informed consent forms and verified that each was signed and dated. Once all informed consent forms were collected students were instructed they could begin the questionnaire. As students finished the questionnaires the research assistant(s) waited and collected the packets. If no class time was allowed the research assistant sent student volunteers home with the packet and informed the students to return them at the next class meeting. During data collection of the packets the research assistants verified the packets for signed informed consent forms from each participant prior to collection.

After survey packets were completed and collected the research team reviewed completed questionnaires at the team office first for study eligibility and referral criteria. Any participant indicating they were pregnant or scoring a 2 or more on items 4, 5, and 6 on the AUDIT were referred to the UTEP Student Health Center. The PI contacted the participant by the preferred designated contact method and asked to meet them at their convenience at the College of Health Sciences. The PI thanked them for volunteering, explained why the individual was not eligible, and provided them with referral information.

Feedback Conditions

In both feedback conditions, after collection of assessment batteries, the researcher or research assistant told the class that they would return at the next class meeting with personalized feedback information over their responses. In the intervening time, the research staff entered each participant's information into an excel spreadsheet and printed the feedback forms to be used at the later date. (Copies of the feedback forms are contained in the Appendix). On that scheduled future date, the researcher or assistant distributed the feedback sheets to students in sealed envelopes. A power point presentation was used to explain the feedback information using a mock feedback form from a pretend individual as the primary

example. The researcher or assistant briefly reviewed the feedback form with the participants explaining the various sections and allowed them to ask questions. Participants were told that they could keep the paper copy printout of their information. The participants were advised to carefully review the feedback sheet. Participants were thanked for their participation and were informed that in approximately 6 weeks they would receive a follow-up assessment in class to complete

PNF only condition. This condition represents the traditional or standard PNF intervention style used in most past studies (Neighbors, Larimer, & Lewis, 2004). A sample of this form is contained in Appendix B. The feedback form followed a similar format as the PNF modeled after the normative feedback component of the BASICS intervention (Dimeff, Baer, Kivlahan, & Marlatt, 1999). PNF was modeled on the normative feedback component of the Brief Alcohol Screening and Intervention for College Students (BASICS; Dimeff, Baer, Kivlahan, & Marlatt, 1999) and similar to the format used at UTEP through the BASICS program and the format used in Neighbors, Larimer, & Lewis (2004) and Neighbors, Lewis, Bergstrom, & Larimer (2006).

The procedure was designed similar to the Neighbors et. al., study (2004) to communicate, "this is how much you drink, this is how much you think the typical student drinks, and this is how much the typical student actually drinks". Specifically, participants in this condition received feedback regarding their alcohol consumption and related behaviors. The feedback sheet included information regarding a summary of the student's drinking patterns for the reported average quantity consumed on each occasion (quantity), the number of days one drank alcohol (frequency), and their highest drinking day (peak). Participants then received a percentile ranking comparison of their alcohol consumption patterns to that of other college students' campus norms. Participants also received estimated Blood Alcohol Level (BAL) information for typical average BAL, highest peak BAL, and an estimate of how long it would take to return to normal.

Charts on all the above information ranked percentages of where one stands in comparison to other students; who drinks more and who drinks less. Participants also received estimated feedback based on the average number of drinks consumed in the past year as to where their associated grade point average would fall if the drinking pattern continued. Feedback information also included report of alcohol-related problems participants personally experienced. Specifically, this feedback included the number of reported alcohol-related consequences they experienced (e.g., fighting with a friend, passing out) and compared the number of consequences to the number of consequences an average student experiences. Also, a summary of each individual's beliefs about alcohol effects they expect to experience from drinking (e.g., act more sociable) was received. Finally, participants received a list of strategies or tips one might use to reduce the negative effects of alcohol consumption. Suggestions included, keeping track of how many drinks you are having, determining in advance not to exceed a set number of drinks, and switching between alcoholic and non-alcoholic drinks.

Feedback comparison information was based on actual campus norms. Actual campus norms consisted of data collected on the same campus in recent years from a large sample of undergraduate students participating in the BASICS program at UTEP.

PNF plus coping. Feedback information consisted of the exact same personalized alcohol information plus additional personalized feedback on coping behaviors and tips on how to cope more effectively. A sample of this form is contained in Appendix C. The coping feedback was modeled after the standard normative feedback intervention format. Feedback included information on stress and coping patterns and those patterns compared with other college student norms. Specifically, participants received an overall stress score based on the information provided and this score was compared to student campus norms. Also a percentile ranking chart highlighted individual stress levels relative to others.

Participants then received information on the strategies they reported using most to cope

with stress (e.g., planning and problem solving, escape and avoidance) and also received overall personal maladaptive and adaptive coping scores and comparisons of those scores to peer norm scores. These scores were also displayed as a percentile ranking of the comparison of individuals who coped worse or better than they do and where they fell within. Feedback also included information on individual reported motives to drink. The feedback sheet summarized the four drinking motives (i.e., coping, enhancement, social, and conformity) and displayed the percentages of each motive in a chart. Lastly, participants received tips on how to manage stress and how to cope in more adaptive ways. Suggestions included practicing relaxation skills, taking a walk or a “time out”, or setting goals and coming up with a plan.

Education only (EO) condition. Participants in the education-only control condition also completed the full assessment battery but did not receive any type of feedback sheet. They instead received a power point presentation about alcohol use in general. The power point presentation was approximately 20 minutes long. The presentation was entitled “5 Smart Steps to Safer Drinking” and covered such content as what a standard drink is, the differences between moderate and heavy drinking, and the differences between alcoholism and abuse. The presentation also covered a description of the legal limit for drinking and how drinking and driving are not safe. The final portion of the presentation provided participants with 5 tips to safer drinking. These tips included, making choices before you drink, learning about how much you can drink, knowing your limits, having a plan, and watching out for alcohol-related problems.

Like participants in the feedback conditions, they were also given time for questions, thanked for their participation, and reminded they would be contacted again in approximately 6 weeks for the follow-up assessment, to be completed in class. Unlike the feedback conditions, they were told they were participating in a longitudinal study of college alcohol consumption.

Six-Week Follow-up

At a scheduled date approximately 6-weeks in the future with professor/instructor discretion the researcher or research assistant revisited the classroom to distribute and in-class

follow-up assessment. The follow-up assessment was in the same format as the initial assessment but shorter, where participants only completed questionnaires consisting of key dependent measures. Key questionnaires included alcohol-related problems, alcohol consumption, perceived norms, coping behaviors, drinking motives, and stress. The follow-up assessment did not include demographic information, desirable responding or alcohol expectancies questions.

Chapter 4

Results

Data Management and Preparation

Prior to analysis, all variables were examined with SPSS statistical software (V. 19.0) for accuracy of data entry, missing values, and fit between their distributions and the assumptions of parametric analysis. Only a few cases had outliers due to data entry errors and these items were corrected by going back to the original forms for verification. A missing values analysis revealed that values appeared to be missing at random. Because the percentages were less than 5%, missing values were filled in using Hot Deck imputation for missing values in IBM SPSS statistics (Myers, 2011) and using age, gender, and alcohol risk scores as the deck variables. Composite variables were created based on overall scale items for the AUDIT, RAPI, Daily Drinking Questionnaire, the Drinking Motives Questionnaire, and the COPE scale.

Alcohol questionnaires and questionnaires related to perceived stress and coping were included for key variables. The alcohol related variables included the following: alcohol risk levels (AUDIT), alcohol-related problems (RAPI), weekly consumption (DDQ), weekly frequency (DDQ), and greatest drinking day (DDQ). Other variables included the following: stress (PSS), social support coping (COPE), approach coping (COPE), avoidance coping (COPE), social motives (DMQ), coping motives (DMQ), enhancement motives (DMQ), conformity motives (DMQ), and drinking norms (DNRF).

Next, all composite variables were examined prior to analysis for outliers and maintenance of distributional assumptions. Results of these analyses found a few drinking outliers which were adjusted to the modal response. The analyses also found and few variables to be skewed including alcohol-related problems, weekly consumption, and greatest drinking day. Specifically, alcohol related problem scores were positively skewed at assessment (2.71) and at follow-up (3.95). Weekly consumption scores were positively skewed at assessment (2.48) and at follow-up (2.85) as was greatest drinking day scores at assessment (1.87) and at

follow-up (2.21). Log transformations of the raw values (Keppel & Wickens, 2004) significantly reduced their skewness. As shown respectively, for assessment and follow up of alcohol-related problems (1.11, 1.49), weekly consumption (.20, .40), and greatest drinking day (.08, .27). All remaining analyses involving these variables were conducted using the transformed values although raw means are presented to facilitate their interpretation.

Principal Components Analysis

Exploratory principal components analysis examined the underlying dimensions of the multiple COPE scales. Examination of the eigenvalues, scree plot, and rotated factor loadings for the various scales of the COPE instrument revealed three factors. Seven cope scales loaded on the first factor, which was labeled, approach coping due to items addressing stressor-oriented coping behaviors (e.g., planning-I make a plan of action). The approach coping subscale indicated acceptable internal consistency at assessment and follow-up (see Table 2).

Four items loaded on the second factor, which was labeled, avoidant coping, due to the items being related to coping behaviors that don't address the situation (e.g., substance use coping-I try to lose myself for a while by drinking alcohol or taking drugs). The avoidant cope subscale indicated fair internal consistency at assessment and follow-up (see table 2).

Three items loaded on the third factor, which was labeled, social support coping, due to the items being related to seeking help from others (e.g., use of emotional social support- I discuss my feelings with someone). The social support cope subscale indicated good internal consistency at assessment and follow-up (see table 2).

One scale, religious coping, did not load on any of the three factors. As such, the scale was deleted from further analysis.

Descriptive Analyses

Table 1 contains the sample characteristics. As indicated, the sample consisted of 74% female participants with 85% of the sample reporting that they were Hispanic or Latino. The mean age for the sample was 24 and the majority of the participants were single (70.8%).

Table 1

Sample Characteristics

Characteristic	Mean (SD) or %
Age	24.04 (6.41)
Gender	
Male	25.7%
Female	74.3%
Ethnicity	
Hispanic	85.4%
Non-Hispanic	7.8%
Black or African American	1.8%
Asian	1.8%
Hawaiian or Pacific islander	1.2%
Other	2.0%
Marital Status	
Single	70.7%
Married	17.6%
Divorced	3.8%
Widowed	.20%
Separated	1.2%
Cohabiting	5.6%
Other	1.0%

N = 501

Table 2 presents the means, standard deviations, and scale alphas for the primary outcome variables at assessment and follow-up. Table 2 also reports analysis of changes over time for the entire sample as well as correlations between assessment and follow-up scores. As shown, all multi-item scales demonstrated reliable levels of internal consistency at both assessment and follow-up time periods. Table 2 also shows significant changes across time for all study variables with analysis of mean differences showing significant declines for all outcomes with the exception of conformity motives. Most changes showed medium to large

effects (η^2) as outlined in Cohen (1988) where a small effect for $\eta^2 = 0.01$, a medium effect is $\eta^2 = 0.06$, and a large effect is $\eta^2 = 0.14$. Finally, correlations show there was considerable consistency among scores at assessment and follow-up.

Table 2

Descriptive Statistics, Scale Reliabilities, and Changes over Time for the Primary Study Variables

	α A / α F	Assessment	Follow-up	<i>F</i>	η^2	<i>r</i>
Alcohol Risk Levels (AUDIT)	.80/.80	4.97 (4.39)	4.28 (4.04)	26.61***	.05	.85***
Alcohol-related problems (RAPI)	.85/.86	1.81 (3.41)	1.33 (2.99)	25.01***	.05	.76***
Weekly Consumption (DDQ)	na	4.89 (6.68)	3.76 (5.56)	28.17***	.05	.78***
Weekly Frequency (DDQ)	na	1.29 (1.29)	1.17 (1.18)	8.57**	.02	.72***
Greatest Drinking Day (DDQ)	na	2.75 (3.14)	2.11 (2.60)	33.86***	.06	.76***
Stress (PSS)	.84/.80	1.77 (.57)	1.60 (.55)	67.76***	.12	.63***
Social Support Cope (COPE)	.81/.87	1.62 (.71)	1.22 (.75)	184.90***	.27	.58***
Approach Cope (COPE)	.78/.85	1.63 (.44)	1.38 (.61)	101.68***	.17	.45***
Avoidance Cope (COPE)	.62/.69	.58 (.37)	.47 (.38)	56.25***	.10	.56***
Social Motives (DMQ)	.95/.95	8.39 (6.24)	7.26 (5.96)	34.60***	.07	.77***
Coping Motives (DMQ)	.91/.90	2.51 (3.79)	2.21 (3.43)	4.64*	.01	.64***
Enhancement Motives (DMQ)	.93/.92	5.21 (5.21)	4.43 (4.90)	22.86***	.04	.76***
Conformity Motives (DMQ)	.88/.91	1.40 (2.67)	1.24 (2.58)	2.25	.00	.58***
Drinking Norms (DNRf)	.83/.82	17.55(12.69)	12.76(11.03)	61.14***	.11	.34***

N = 501; *p < .05, ** p < .01, *** p < .001; estimates of *F*, η^2 , and *r* calculated using log transformed values

Correlational Analysis

Bivariate statistical analysis examined the correlations among all study variables. These results are displayed in Tables 3, 4, 5 and 6. Table 3 contains the correlations between the sample demographics and the drinking related outcomes at assessment and follow-up. As shown, younger individuals tended to have more alcohol-related problems and drink more than older individuals. Likewise, men tended to consume more and have more problems than women. Hispanic ethnicity was unrelated to any of the drinking related outcomes. Lastly, being married correlated negatively with alcohol-related problems at assessment and negatively with

all drinking related variables at follow-up.

Table 3

Correlations between Sample Demographics and Drinking Related Outcomes at Assessment and Follow-up

	Age	Gender	Hispanic	Married
Alcohol Risk Levels at Assessment	-.07	.18**	.00	-.06
Alcohol Risk Levels at Follow-up	-.08	.15**	-.01	-.10*
Alcohol-related problems at Assessment	-.14**	.15**	-.04	-.14**
Alcohol-related problems at Follow-up	-.18***	.16***	-.03	-.16***
Weekly Consumption at Assessment	-.04	.15**	-.04	-.08
Weekly Consumption at Follow-up	-.09*	.17***	.03	-.14**
Weekly Frequency at Assessment	-.00	.14**	-.07	-.07
Weekly Frequency at Follow-up	-.05	.13**	-.03	-.09*
Greatest Drinking Day at Assessment	-.03	.15**	-.03	-.05
Greatest Drinking Day at Follow-Up	-.10*	.17***	.04	-.13**

N = 501; * p < .05, ** p < .01, ***p < .001

Table 4 contains the correlations between the demographics and intermediate outcomes. As shown, younger individuals tended to have more perceived stress, tended to use avoidance coping more, and tended to drink more for conformity motives than older individuals. Men tended to report lower stress and lower use of social support coping. In addition, men reported greater motives for drinking overall than did women. Women reported high drinking norms at follow-up. Similar to the drinking outcomes, being of Hispanic ethnicity was largely unrelated to stress, coping, and drinking motives. Lastly, married individuals were less likely to use less avoidance cope and were less likely to drink to cope and drink to conform at follow-up than single individuals.

Table 4
Correlations between Sample Demographics and Intermediate Outcomes at Assessment and Follow-up

	Age	Gender	Hispanic	Married
Perceived Stress Assessment	-.11*	-.15**	.05	-.03
Perceived Stress Follow-up	-.12*	-.11*	.10*	-.07
Social Support Coping Assessment	-.09*	-.29***	.01	-.00
Social Support Coping Follow-up	-.08	-.21***	.06	-.03
Approach Coping Assessment	.09*	.01	-.08	.05
Approach Coping Follow-up	-.02	-.07	.01	-.02
Avoidance Coping Assessment	-.17***	.02	.04	-.08
Avoidance Coping Follow-up	-.13**	-.01	.05	-.09*
Social Motives Assessment	-.07	.09	-.04	-.02
Social Motives Follow-up	-.09*	.15**	-.03	-.08
Coping Motives Assessment	-.03	.04	-.06	-.05
Coping Motives Follow-up	-.08	.11*	-.00	-.11*
Enhancement Motives Assessment	-.06	.11*	-.05	-.04
Enhancement Motives Follow-up	-.09*	.10*	-.06	-.06
Conformity Motives Assessment	-.14**	.12**	-.04	-.01
Conformity Motives Follow-up	-.11**	.13**	-.01	-.14**
Drinking Norms Assessment	-.01	.03	-.02	.04
Drinking Norms Follow-up	-.02	.13**	.02	.04

N = 501; * p < .05, ** p < .01, ***p < .001

Intercorrelations among drinking and intermediate outcomes are presented in tables 5 and 6. Table 5 shows all the inter-correlations at assessment and table 6 shows all the inter-correlations at follow-up. Both tables show that drinking-related outcomes and drinking motives correlated positively and significantly among each other. Among the other variables, stress correlated positively with alcohol risk levels and alcohol-related problems. Stress also

correlated with the coping factors of social support coping, approach coping, and avoidance coping. Lastly, stress correlated positively with all the drinking motives. Among the cope outcomes, social support coping and approach coping were unrelated to all drinking outcomes and unrelated to all the drinking motives. In contrast, avoidance coping correlated positively with all of the drinking outcomes and all the drinking motives. As noted, these patterns of association were relatively consistent at assessment and at follow-up.

Table 5

Correlations among Drinking Outcomes and Coping Variables at Assessment

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Alcohol Risk Levels		.76***	.81***	.70***	.80***	.13**	-.02	-.04	.26***	.69***	.48***	.66***	.25***	.20***
2. Alcohol-related problems			.65***	.60***	.63***	.20***	.00	-.02	.37***	.54***	.49***	.57***	.24***	.16***
3. Weekly Consumption				.89***	.98***	.07	-.02	.01	.18***	.68***	.40***	.59***	.16**	.22***
4. Weekly Frequency					.81***	.05	-.00	-.02	.15**	.58***	.36***	.50***	.14**	.18***
5. Greatest Drinking Day						.07	-.03	.00	.17***	.68***	.39***	.59***	.16**	.21***
6. Stress							.22***	-.20***	.45***	.17***	.33***	.16***	.15**	-.01
7. Social Support Cope								.33***	.22***	.05	.07	.03	.06	.09
8. Approach Cope									.12**	.03	.00	.07	-.04	.30
9. Avoidance Cope										.26***	.51***	.33***	.30***	-.05
10. Social Motives											.59***	.79***	.38***	.11*
11. Coping Motives												.63***	.36***	.07
12. Enhancement Motives													.31***	.08
13. Conformity Motives														-.02
14. Drinking Norms														-

N = 501; * p < .05, ** p < .01, ***p < .001

Table6

Correlations among Drinking Outcomes and Coping Variables at 6 week Follow-up

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Alcohol Risk Levels	-	.72***	.78***	.70***	.75***	.11*	.02	-.02	.24***	.65***	.54***	.63***	.22***	.15**
2. Alcohol-related problems			.60***	.52***	.58***	.17***	.05	.00	.31***	.53***	.59***	.57***	.27***	.09*
3. Weekly Consumption				.90***	.97***	.01	-.05	-.03	.15**	.67***	.42***	.60***	.07	.14**
4. Weekly Frequency					.81***	-.00	-.02	.01	.15**	.58***	.36***	.52***	.16***	.12**
5. Greatest Drinking Day						.01	-.06	-.04	.14**	.66***	.41***	.59***	.17***	.12**
6. Stress							.30***	.03	.50***	.11*	.31***	.14**	.15**	-.03
7. Social Support Cope								.65***	.45***	.03	.12**	.09*	.06	-.03
8. Approach Cope									.39***	.06	.10*	.13**	.07	-.07
9. Avoidance Cope										.20***	.41***	.28***	.27***	-.05
10. Social Motives											.56***	.77***	.38***	.10*
11. Coping Motives												.63***	.46***	.02
12. Enhancement Motives													.34**	.07
13. Conformity Motives														-.01
14. Drinking Norms														-

N = 501; * p < .05, ** p < .01, ***p < .001

Manipulation Checks

Two questions were included in the follow-up questionnaire as manipulation checks to see if individuals were sensitive to the information presented in the different conditions. Specifically one question asked, “I remember receiving previous information on my alcohol consumption patterns”, whereas a second question asked “I remember receiving previous information on my stress and coping patterns”. Answers to both questions were in yes or no format.

It was anticipated that individuals in either PNF condition would answer yes to remembering receiving feedback on their alcohol consumption patterns, whereas only individuals in the PNF + coping condition would answer yes to remembering receiving information on stress and coping patterns.

Univariate analyses of variance (ANOVA) examined between groups differences at follow-up. The results of these analyses showed significant differences for remembering receipt of alcohol feedback. In the alcohol only feedback condition and the alcohol plus coping condition 84.5% and 86.9% of participants, respectively, remembered receiving alcohol feedback information. In contrast, only 46.5% of the education only control condition reported remembering receiving such feedback; $F = 46.61$, $p = .000$, $\eta^2 = .16$.

The results also showed significant group differences for the coping feedback question. In the alcohol plus coping feedback condition 90.5% of participants remembered receipt of coping feedback. In contrast, only 75.7% of the alcohol condition and 49.6% of the education control condition reported remembering receiving coping feedback information; $F = 36.07$, $p = .000$, $\eta^2 = .13$. Overall, these results suggest that participants were sensitive to the various treatments. Specifically, those receiving PNF remembered receiving it more than those who did not and those receiving coping feedback remembered it more than those who did not. These results suggest that the manipulations were at least memorable to participants.

Primary Analysis

A series of 2 x 3 x 2, alcohol risk level by intervention group by time, mixed model univariate analyses of variance (ANOVA) examined between groups differences on the various outcomes including alcohol-related problems, alcohol risk levels, and alcohol consumption (weekly consumption, weekly frequency, and greatest drinking day). The statistical design included two between-subjects factors, risk level and intervention group, and one within-subjects factor, time, with two levels: assessment and follow-up. Intervention condition had three levels, PNF, PNF plus coping, or an education control.

Risk level was added to the statistical design to account for the fact that (a) PNF is an intervention designed for relatively higher risk students and (b) the procedures for the present study were such that the data included a large number of lower-risk drinkers and even a considerable number of non-drinkers. As a factor in the statistical design, risk level had two levels, high or low, based on an assessment AUDIT total score. An AUDIT score of 5 was determined as the cut of level where participants scoring less than 5.0 were placed in the low risk group and participants scoring 5.0 or higher were placed in the high risk group. In theory, statistical support for the hypotheses should be stronger among those with higher baseline risk levels, whereas less change, and potential floor effects, might be evident among lower risk individuals.

Accordingly, support for the study hypotheses would be indicated by a significant intervention group by time interaction or by an alcohol risk group by intervention group by time interaction. In the former it was expected that the PNF and PNF plus coping intervention groups would show significant declines compared to the education controls; in the latter it was expected the same pattern would occur, but only among those high in alcohol risk levels.

This analysis was applied to three sets of variables: (a) drinking outcomes including alcohol risk levels (AUDIT scores), alcohol-related problems (log transformed RAPI scores), weekly consumption (log transformed DDQ Quantity), weekly frequency (DDQ Frequency), and

greatest drinking day (log transformed DDQ); (b) drinking motives (DMQ social, coping, enhancement, and conformity motives); and drinking norms (DNRF); and (c) stress (PSS) and coping (social support, approach, and avoidance coping from the COPE).

Two questions in particular were addressed:

Question 1: Were there differences in the changes in rates of alcohol-related problems among the two levels of alcohol risk, between the three groups across the two time periods and what the relative effect sizes were.

Question 2: Were there differences in the changes in rates of alcohol consumption among the two levels of alcohol risk, between the three groups across the two time periods and what the relative effect sizes were.

Tables 7 and 8 and 9 summarize the results of these analyses. Table 7 shows the results of these analyses for the drinking related outcomes. As shown, there were large main effects for alcohol risk group for all drinking related outcomes as well as large main effects for time (shown discussed earlier in Table 2). There were also significant alcohol risk group by time interactions for all the drinking related outcomes. These analyses indicated that individuals with higher risk levels had overall greater declines over time on all outcomes, relative to individuals with lower risk levels who did not change. Simple effects tests of the risk group by time interaction showed that the rate of decline was significantly greater among high risk individuals, compared with low risk individuals. Table 10 contains a summary of all simple effects tests for the alcohol variables.

Importantly, and relating to the study hypotheses, neither the intervention group by time, nor the risk group by intervention group by time interaction, was significant. Instead, the results suggest that the changes observed over time were similar for all three interventions (PNF, PNF plus coping, and Education control).

Table 7

Results of Alcohol Risk Levels by Intervention Condition X Time ANOVA for Drinking Related Outcomes

Effect	df	Alcohol Risk Levels		Alcohol-related problems		Weekly Consumption		Weekly Frequency		Greatest Drinking Day	
		F	η^2	F	η^2	F	η^2	F	η^2	F	η^2
Alcohol Risk Group (A)	1/495	797.25***	.62	316.67***	.39	500.38***	.50	291.89***	.37	468.01***	.49
Intervention Group (I)	2/495	1.93	.01	.26	.00	.67	.00	.17	.00	1.63	.01
Time (T)	1/495	67.06***	.12	35.46***	.07	37.91***	.07	11.69**	.02	45.67***	.08
A X I	2/495	1.43	.01	.04	.00	.73	.00	.75	.00	1.03	.00
A X T	1/495	69.60***	.12	23.31***	.05	22.84***	.04	8.50**	.02	27.53***	.05
I X T [#]	2/495	.06	.00	.69	.00	1.50	.01	1.88	.01	.63	.00
A X I X T [#]	2/495	.66	.00	.36	.00	.78	.00	1.79	.01	.41	.00

N = 501; * p < .05, ** p < .01, ***p < .001; [#]Reflect tests of the main hypotheses

Table 8 shows the results of similar analyses for drinking motives and drinking norms. As shown, there were large main effects for alcohol risk group across all variables as well as large main effects for time (see table 2), the exception being conformity motives. There were also significant alcohol risk group by time interactions for social and enhancement motives. These analyses indicated that individuals with higher risk levels had greater declines over time relative to individuals with lower risk levels. Simple effects tests of the alcohol risk group by time interaction showed that the rate of decline was significantly greater among high risk individuals for both motives (see table 10).

Importantly and contrary to the results for the alcohol variables, significant intervention group by time interactions emerged for all drinking motive variables. Simple effects tests of these variables showed that declines in drinking motives was significantly greater among those in the PNF only and educational control conditions relative to those in the PNF plus coping condition (see table 11). There was no similar interaction for drinking norms nor were there any significant risk group by intervention group by time interactions.

Table 8

Results of Alcohol Risk Levels by Intervention Condition X Time ANOVA for Drinking Motives and Norms

Effect	Df	Social Motives		Coping Motives		Enhancement Motives		Conformity Motives		Drinking Norms	
		F	η^2	F	η^2	F	η^2	F	η^2	F	η^2
Alcohol Risk Group (A)	1/495	342.32***	.41	125.20***	.20	263.72***	.35	24.17***	.05	14.51***	.03
Intervention Group (I)	2/495	.39	.00	.50	.00	.36	.00	.01	.00	1.79	.01
Time (T)	1/495	35.14***	.07	4.92*	.01	26.12***	.05	1.30	.00	56.30***	.10
A X I	2/495	2.66	.01	1.84	.01	2.13	.01	.51	.00	1.51	.01
A X T	1/495	6.22*	.01	2.16	.00	9.41**	.02	.25	.00	3.58	.01
I X T [#]	2/495	8.79***	.03	4.31*	.02	5.35**	.02	3.96*	.02	1.80	.01
A X I X T [#]	2/495	1.88	.01	.12	.00	.88	.00	.44	.00	1.34	.01

N = 501; * p < .05, ** p < .01, ***p < .001; [#]Reflect tests of the main hypotheses

Table 9 shows the results of the analyses for stress and coping variables. As shown, there were only two main effects for alcohol risk group for stress and avoidance coping. There were large main effects for time in all of the stress and coping variables (see table 2). There were no alcohol risk groups by time interactions for any of these outcomes. Importantly there was one significant intervention group by time interaction for social support coping. Simple effects tests of the intervention group by time interaction showed that the rate of decline was greatest among the PNF condition and more modest among the other two conditions (see table 11). Finally, there was no significant alcohol risk group by intervention group by time interactions.

Table 9

Results of Alcohol Risk Levels by Intervention Condition X Time ANOVA for Stress and Coping

Effect	df	Stress		Social Support Coping		Approach Coping		Avoidance Coping	
		F	η^2	F	η^2	F	η^2	F	η^2
Alcohol Risk Group (A)	1/495	7.08**	.01	1.21	.00	3.34	.01	26.06***	.05
Intervention Group (I)	2/495	.25	.00	1.29	.01	1.02	.00	.07	.00
Time (T)	1/495	63.88***	.11	183.81***	.27	101.64***	.17	59.47***	.11
A X I	2/495	.83	.00	1.20	.01	.28	.00	.05	.00
A X T	1/495	1.85	.00	.42	.00	.05	.00	2.84	.01
I X T [#]	2/495	.28	.00	3.57*	.01	1.22	.01	.27	.00
A X I X T [#]	2/495	2.79	.00	1.86	0.01	0.65	.00	2.08	0.01

N = 501; * p < .05, ** p < .01, ***p < .001; [#]Reflect tests of the main hypotheses

Table 10

Simple Effects Tests for the AUDIT Group by Time Interaction

	Assessment	Follow-up	<i>F</i>	<i>p</i>	η^2
Alcohol Risk Levels					
Low	2.05 (1.78)	2.03 (1.95)	.03	.858	.00
High	9.38 (3.33)	7.66 (4.01)	62.15	.000	.24
Alcohol Relate Problems					
Low	.07 (.19)	.05 (.16)	2.05	.153	.01
High	.54 (.39)	.42 (.38)	25.75	.000	.12
Weekly Consumption					
Low	.26 (.33)	.24 (.30)	2.83	.094	.01
High	.94 (.33)	.79 (.38)	29.69	.000	.13
Weekly Frequency					
Low	.67 (.90)	.64 (.84)	.76	.385	.00
High	2.23 (1.24)	1.98 (1.16)	8.74	.003	.04
Greatest Drinking Day					
Low	.22 (.27)	.20 (.25)	2.94	.087	.01
High	.74 (.24)	.61 (.28)	38.41	.000	.16
Social Motives					
Low	5.21 (5.15)	4.42 (4.93)	11.08	.001	.04
High	13.14 (4.46)	11.58 (4.71)	27.23	.000	.12
Enhancement Motives					
Low	2.66 (3.97)	2.27 (3.53)	4.13	.040	.01
High	9.05 (5.22)	7.69 (4.89)	23.40	.000	.11

N = 501; * $p < .05$, ** $p < .01$, *** $p < .001$; low (n=300) high (n = 201)

Table 11

Simple Effects Tests of Intervention Group by Time Interactions

	Assessment	Follow-up	<i>F</i>	<i>p</i>	η^2
Social Motives					
PNF	8.50 (6.50)	6.60 (6.07)	51.01	.000	.20
PNF + Coping	8.36 (5.70)	8.24 (5.55)	0.16	.735	.00
Education control	8.19 (6.53)	7.09 (6.25)	8.29	.005	.06
Coping Motives					
PNF	2.62 (3.73)	1.94 (3.04)	10.28	.002	.05
PNF + Coping	2.20 (3.57)	2.43 (3.49)	1.09	.298	.01
Education control	2.72 (4.15)	2.35 (3.92)	1.75	.188	.01
Enhancement Motives					
PNF	5.37 (5.64)	4.11 (5.07)	29.72	.000	.13
PNF + Coping	5.16 (5.12)	5.03 (4.52)	.20	.659	.00
Education control	5.02 (5.72)	4.17 (5.08)	6.47	.012	.05
Conformity Motives					
PNF	1.54 (2.80)	1.00 (2.15)	13.26	.000	.06
PNF + Coping	1.26 (2.49)	1.43 (2.88)	.79	.380	.01
Education control	1.38 (2.69)	1.39 (2.77)	.00	.972	.00
Social Support Coping					
PNF	1.69 (.70)	1.27 (.75)	97.83	.000	.32
PNF + Coping	1.56 (.96)	1.25 (.76)	42.12	.000	.20
Education control	1.60 (.76)	1.09 (.74)	51.82	.000	.29

N = 501; * $p < .05$, ** $p < .01$, *** $p < .001$

Mediational Analysis

Path models examined whether coping outcomes would serve as an additional mediator of intervention effects in the condition that includes the stress and coping information.

Specifically, these analyses examined whether changes in perceived norms or changes in drinking to cope accounted for declines in alcohol risk levels and alcohol-related problems among those exposed to experiences intended to change them. For example, it was expected that receipt of personalized normative alcohol feedback by individuals in the two conditions receiving such feedback would produce changes in their perceived drinking norms which, in turn, should have resulted in reduced levels of alcohol consumption and consequences. Individuals not exposed to alcohol feedback, however, should not exhibit such changes.

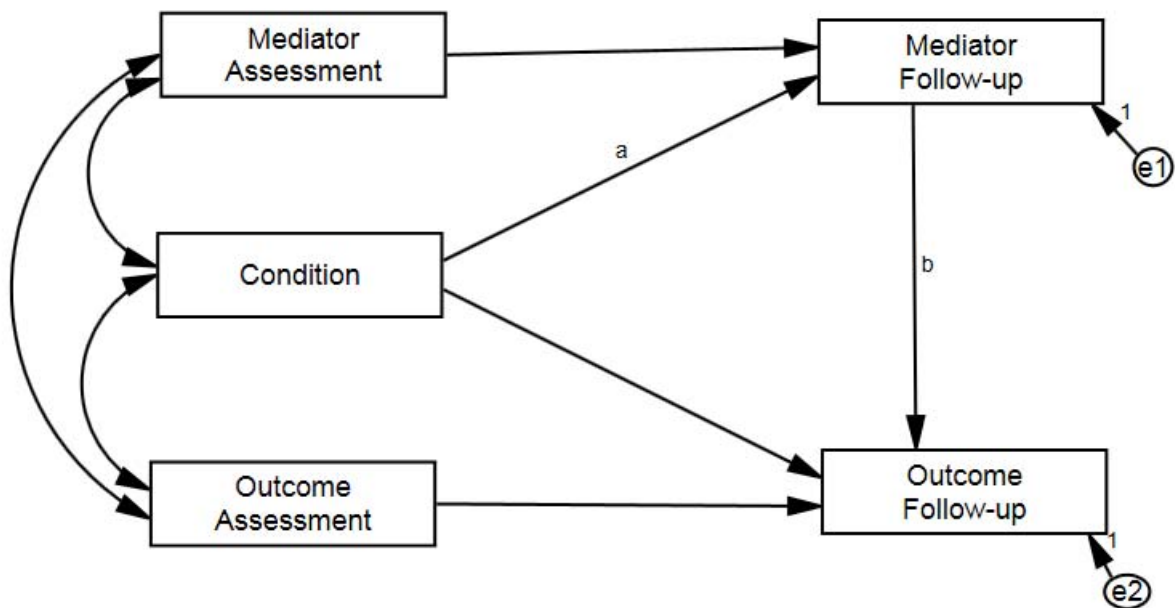
These analyses used two contrast independent variables to reflect receipt of (a)

personalized normative feedback (2 conditions) vs. education or (b) personalized coping information (1 condition) vs. the other two conditions. In the former, changes in drinking norms served as the hypothesized mediator; in the latter, changes in drinking to cope motives served as the hypothesized mediators. All analyses controlled for assessment levels of the outcomes and mediators.

Figure 1 presents a general model of these analyses. As shown, the critical tests in these models are tests of the indirect effects or *ab* cross products of (a) the relationships between the independent variable (e.g., PNF vs. control) and the mediator with (b) the relationship between the mediator and the outcome. All critical tests were conducted in SPSS AMOS version 20 using bootstrapping with 5000 bootstrap samples and 95% confidence intervals surrounding the estimate of the indirect effect (Hayes, 2013; Morera & Castro, 2013).

Figure 1.

Path Model Example of the Mediation of Change in Outcome Among Those Experiencing the Various Treatments

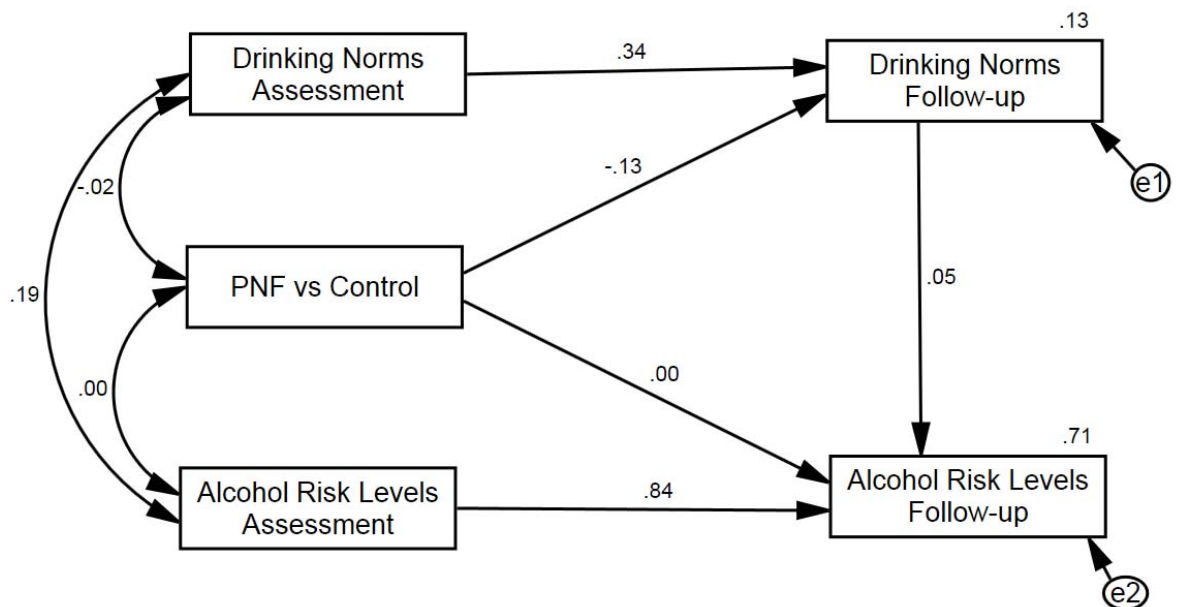


The first model examined drinking norms as a mediator of changes in alcohol risk levels. Results of this analysis are shown in Figure 2. As shown, the path from the condition contrast

was significant ($b = -.13, p = .003$) suggesting that individuals receiving PNF showed declines in perceived drinking norms. The relationship between change in drinking norms at follow-up and alcohol risk levels at follow up was positive ($b = .05, p = .052$) suggesting that greater perceived norms were associated with greater risk level scores. Finally, results of the test of the cross product was significant, mean = $-.055, p = .015, 95\% \text{ CI } [-.152, -.008]$. This analysis suggests that decreases in drinking norms among participants in the two intervention conditions—who experienced personalized normative feedback—contributed significantly to changes in their alcohol risk levels at follow-up.

Figure 2.

Path Model Examining Drinking Norms as a Mediator of Change in Alcohol Risk Levels Among Those Experiencing Personalized Normative Feedback

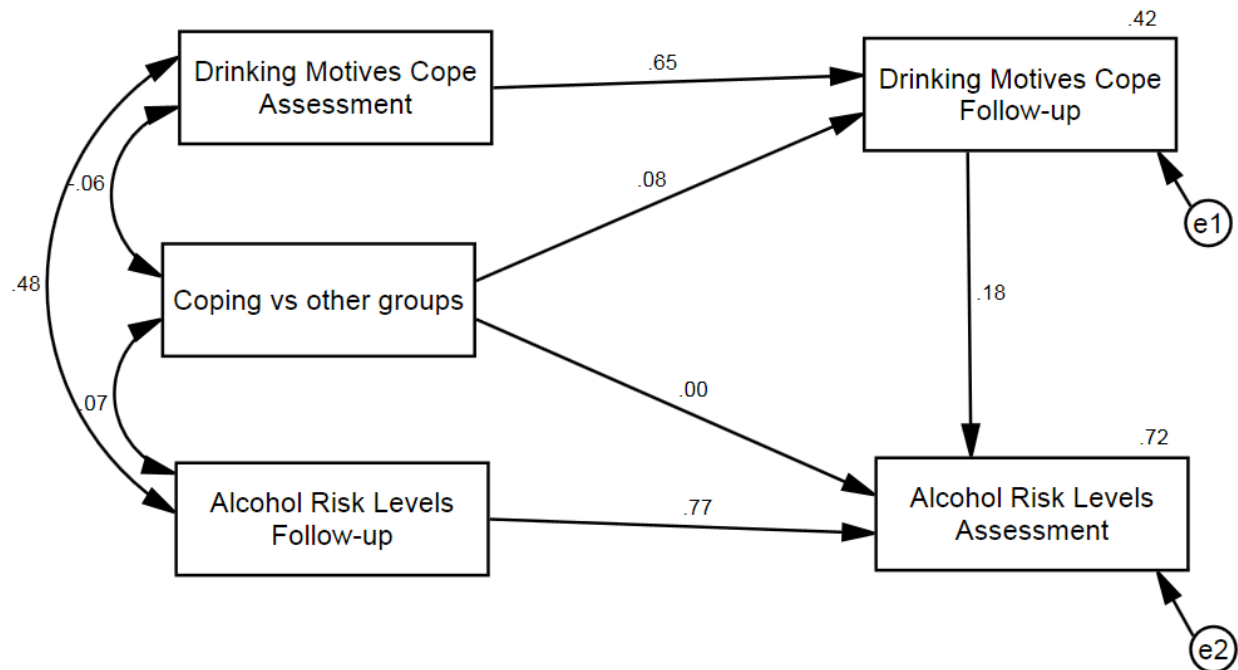


The second model examined drinking to cope as a mediator of changes in alcohol risk levels. Results of this analysis are shown in Figure 3. As shown, the path from the condition contrast was significant ($b = .08, p = .014$) suggesting that individuals receiving PCF showed increases in drinking to cope. The relationship between change in drinking to cope at follow-up and alcohol risk levels at follow-up was positive ($b = .18, p < .001$) suggesting that greater

drinking to cope motives were associated with greater alcohol risk levels. Finally, results of the test of the cross product was significant, mean = .13, $p = .007$, 95% CI [.032, .283]. This analysis suggests that increases in drinking to cope motives among participants in the intervention where personalized normative coping feedback was experienced contributed significantly to changes in their alcohol risk levels at follow-up.

Figure 3.

Path Model Examining Drinking to Cope as a Mediator of Change in Alcohol Risk Levels Among Those Experiencing Personalized Coping Feedback

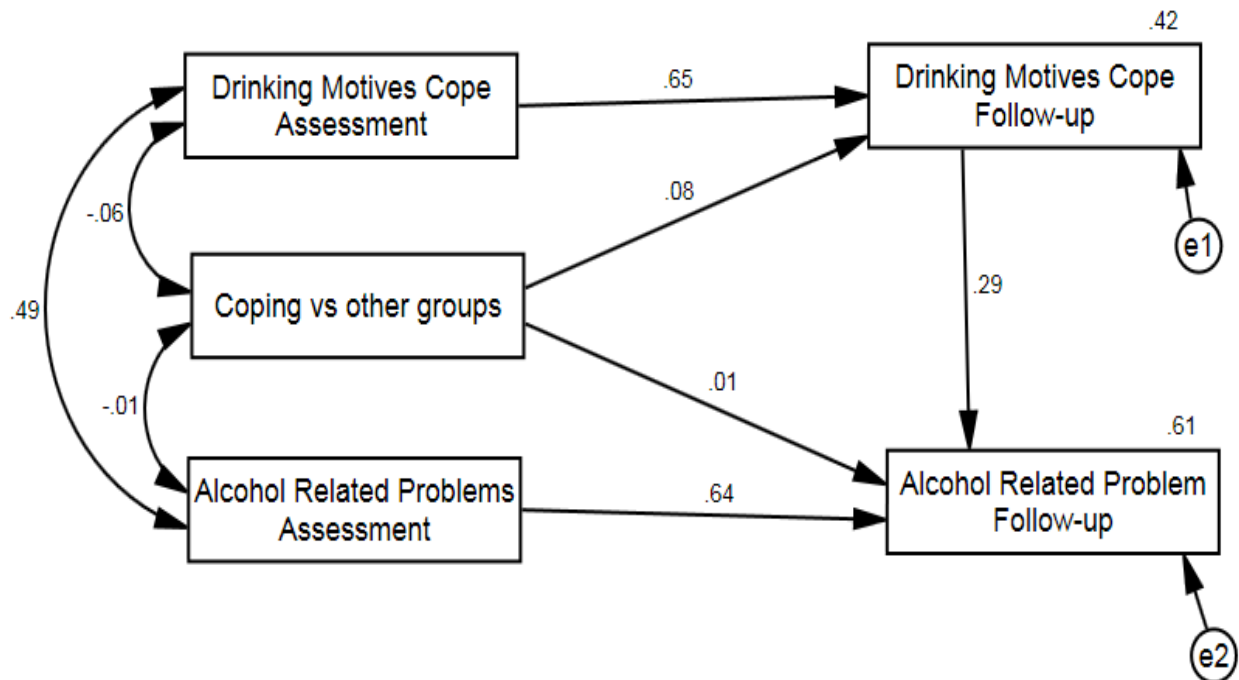


The third model examined drinking to cope as a mediator of changes in alcohol-related problems. Results of this analysis are shown in Figure 4. As shown, the path from the condition contrast was significant ($b = .08$, $p = .014$) suggesting that individuals receiving PCF showed increases in drinking to cope. The relationship between change in drinking to cope at follow-up and alcohol-related problems at follow-up was positive ($b = .29$, $p < .001$) suggesting that greater drinking to cope motives were associated with greater alcohol-related problems. Results of the test of the cross product was significant, mean = .016, $p = .007$, 95% CI [.005, .031]. This analysis suggests that increases in drinking to cope motives among participants in the

intervention where personalized coping feedback was experienced contributed significantly to changes in their alcohol-related problems at follow-up.

Figure 4.

Path Model Examining Drinking to Cope as a Mediator of Change in Alcohol-related problems Among Those Experiencing Personalized Normative Coping Feedback



Chapter 5

Discussion

This study examined whether the addition of a coping component to a PNF intervention could enhance its overall effectiveness in reducing alcohol-related problems and consumption among college students. This study also examined whether changes in coping behavior mediated the impact of the enhanced intervention, and whether normative feedback mediated the impact of the PNF interventions. The main hypotheses were that, (a) PNF interventions with an added coping feedback component would have greater impact on reducing alcohol risk levels, alcohol-related problems, and alcohol consumption than standard PNF interventions, and (b) coping would mediate program outcomes when included as part of an enhanced PNF intervention.

Lack of Differential Effectiveness

Overall, the results of this study did not support the hypotheses of differential effectiveness across the experimental conditions and enhancement of PNF interventions through inclusion of information and feedback on stress and coping. Specifically, tests of the key two- and three-way interactions were not significant for any of the drinking outcomes. These results were disappointing in light of the expectation that PNF would reduce alcohol risks more than education, and in light of the expectation that the addition of coping information would further enhance the effectiveness of the PNF intervention. Overall, the results appeared to show modest declines over time among all the alcohol consumption measures, which was positive from a public health standpoint, however, similar rates of decline were seen among all three conditions. In general, these effects were medium to large in size, using standard conventions for η^2 effect sizes, as Cohen (1992) suggests effect sizes of .01 are small, .06 are medium, and .14 are large. These standard conventions are equal to Cohen's conventions of d where .20 is small, .50 is medium and .80 is large. Overall, the results show a coherent picture of change among the three conditions, with changes in drinking outcomes being mirrored by expected

changes in the intermediate outcomes (e.g., perceived norms). Unfortunately for the study hypotheses, the changes seen in the experimental groups were also observed in the control condition, where little or no change was anticipated.

A similar investigation was conducted among the intermediate outcomes. Here, there was some support for differential effectiveness across the experimental conditions. However, such support was mainly for the impact of PNF and not for the enhancement of such PNF interventions through inclusion of coping information and feedback. Specifically, tests of the key two- and three-way interactions were significant for all of the drinking motives and social support coping. Specifically, individuals who received PNF reported greater reductions in all drinking to cope motives at follow-up and greater reductions in use of social support coping. Overall, however, these results were disappointing in light of the expectation that PNF plus coping would reduce the coping related outcomes more than the other two conditions.

Differential Effectiveness among Higher Risk Drinkers

The study also examined whether the expected effects would emerge more strongly among higher risk drinkers at baseline relative to more moderate drinkers and abstainers. Higher risk drinkers did show significant declines in all of the alcohol risk outcomes and among social and enhancement motives. As above, however, these effects did not vary as a function of the experimental condition, but were seen relatively equally across the experimental and control conditions. Although it was not surprising that drinking for social and enhancement motives decreased significantly over time, it was surprising that drinking to cope did not decrease significantly.

Part of the rationale for including low risk drinkers and abstainers in the study was to see if any of the conditions might have a protective effect as regards to drinking uptake over time. Examination of changes in the low risk drinkers did not show evidence for a protective effect of the intervention with the exceptions of social and enhancement motives for drinking which did decline significantly among both the high and low risk drinkers. Of course, the analyses of low

risk drinkers are difficult to interpret because of possible floor effects for many of the drinking outcomes.

Mediational Investigation of Lack of Differential Effectiveness

Mediational analyses shed light for the effectiveness of PNF. Generally consistent with the study hypotheses, these analyses showed that changes in the mediational outcomes were greatest among the two PNF intervention conditions relative to educational controls.

Specifically, exposure to alcohol related feedback resulted in significant declines in estimates of normative drinking, estimates which in turn showed a positive association with drinking outcomes. Thus, this effect showed that exposure to PNF (in two conditions) reduced risky drinking indirectly through its effect on reducing perceptions of the “normalness” of drinking.

In contrast to the study hypotheses, however, exposure to coping feedback not only did not result in decreased reports of drinking to cope, but actually resulted in *increased* reports of drinking to cope. One interpretation of this effect is that feedback on stress and drinking to cope actually encourages people to drink more. It is also possible, and perhaps more plausible, that this pattern probably reflected participants becoming more aware that they do, in fact, drink to cope at times, and their being more aware of this enhanced associations between drinking to cope and drinking outcomes among participants receiving coping feedback. Thus, considering all analyses together, there is some evidence for the effectiveness of PNF, but little evidence that the addition of coping information had the intended effect and some evidence that it may have had the opposite effect.

In summary, then, these results of this study showed that all three conditions—including the control condition--exhibited relatively equal declines in drinking outcomes. Examination of the intermediate outcomes and the mediational analyses, suggested that PNF may have accounted for some of these changes in the two conditions with it. Overall, coping feedback did not enhance the effectiveness of PNF, and examination of the intermediate outcomes suggests that it may have hindered PNF's effectiveness. Finally, it is unknown why individuals in the

education only condition (i.e., those who were not expected to change) also showed parallel declines in drinking outcomes. Examination of the intermediate outcomes with regard to the education only participants suggests the intermediate outcomes examined in this study were not responsible and that other factors were responsible for changes among this group.

There are two possible reasons for the pattern of results observed among the education only participants: (a) they were real effects due to learning from the presentation, or (b) they were artificial effects reflecting other influences such as social desirability bias or expectancies about the study.

The learning option suggests that regardless of condition students learned, either from the information presented or from their own completion of the questionnaires, that high levels of drinking, high levels of stress and coping, and high levels of drinking to cope motives are maladaptive things for college students. As such, 6 weeks later, their reports accurately reflected that they took action to correct these issues. This explanation suggests that these interventions had a real impact and participants experienced real changes in these outcomes. These changes were found to be particularly strong among higher risk drinkers and not significant for lower risk drinkers. As such, providing support for this explanation.

The social desirability or demand characteristic effect suggests that regardless of condition students learned the purpose and intent of the study and reported making changes in a direction that they perceived as being more socially desirable/favorable, or reported responses that were consistent with their own hypotheses regarding the intent of the study. Unlike the learning or testing option above, this explanation suggests little or no real impact of the interventions but is more consistent with the idea that there were demand characteristics operating in the study. This explanation is less plausible than the learning or testing option. Social desirability was controlled for and the results show little to no differences. Moreover, in the alcohol only PNF condition and the education only condition drinking motives and stress and coping were not discussed. So it is difficult to know how participants would have known which

way to change and would have done so consistently.

Additional Findings

The study also found a variety of several other interesting effects. Most notably the study found that changes in alcohol, stress, and coping and motives were much greater for higher risk drinkers than low risk drinkers. Specifically, interactions involving higher and lower risk drinkers changing over time were significant for seven of fourteen outcomes (see table 10) suggesting that the intervention approaches are all more appropriate for higher risk drinkers rather than low risk drinkers.

Although they generally did not support the main study hypotheses there were several significant effects for the experimental conditions, particularly among the drinking motives and social support coping. These results indicated that declines in drinking motives were largest among those in the PNF only condition. This group also showed the greatest decline in social support coping.

The results of this study show some consistency with past studies. Specifically, because PNF produced expected changes in drinking and corresponding variables as also noted in the literature (Carey, Scott-Sheldon, Carey, & DeMartini, 2007; Larimer & Crounse, 2002 & 2006). Though inconsistently this study found effect sizes tended to be in the large range as opposed to the literature finding consistent but small effects for PNF. This finding is unusual especially considering that these interventions showing small effect sizes traditionally have been provided individually (Dimeff et al., 1999)

The present results were also inconsistent with past findings suggesting that PNF is not as effective for heavy drinkers (Carey et al, 2007, as the current study showed greater reductions in alcohol risk levels among heavier drinkers as compared to low risk drinkers. Another inconsistent finding with the literature was the significant declines particularly in drinking among the educational control group. As described earlier, it is unclear as to why education had such a strong impact in this population when typically used in college students it has not.

Interestingly, the efficacies of the education results are consistent with another recent study conducted in El Paso. Specifically, Monks (2012) also found that the two experimental conditions in their study were no more effective than the educational control condition among El Paso firefighters. These two recent findings may reflect that this population is more receptive to education than elsewhere.

In regard to alcohol-related problems, this study is somewhat inconsistent with the literature. As summarized in the review of the literature, PNF interventions appear equally or less impactful for reducing alcohol-related problems. Studies investigating alcohol-related problems have suggested that PNF has small to limited impact or even a late impact on problems. This conclusion is drawn on the mixed results found in the literature. Studies finding reductions in alcohol-related problems have usually shown insignificant results or have shown significant reductions among mandated students only. Other studies have not found any reductions. Overall there has been less success in PNF studies reducing alcohol-related problems, and these interventions seem more effective in reducing consumption (Sheldon, Carey & DeMartini, 2007). Although, this was not the case in this study. This study found PNF to decrease alcohol-alcohol-related problems as much as consumption. This study found large main effects for alcohol group for all alcohol-related problems, as well as large main effects for time, and there were also significant alcohol group by time interactions for alcohol-related problems.

The study's examination of the mediational factors among drinking norms showed that experience of feedback resulted in changes in drinking norms which were in turn related to decreases in alcohol risk levels. This significant overall effect provides evidence that normative feedback results in changes in drinking levels as this effect was not experienced by the education control group. As noted previously, these interventions are particularly effective in correcting misperceptions about alcohol-related social and behavioral norms. They work especially well in the college population because the key theory is that students care about how

they compare with their peers and will be motivated to change their drinking patterns relative to others (Neighbors, Larimer, & Lewis, 2004). The findings in this study are consistent with research showing that providing accurate norms about the drinking of others on college campuses is sufficient to motivate a student to reduce his/her drinking (Dimeff, Baer, Kivlahan, & Marlatt, 1999; Collins, Carey, Sliwinski, 2002; Lewis & Neighbors, 2004; Borsari & Carey, 2005).

As identified in the review of the literature it has not been clear as to what mediating mechanisms are responsible for producing the efficacious nature of PNF interventions. This study provides additional support for normative feedback in arousing awareness on discrepancies on what is regarded as normal drinking. Studies examining mediation effects have primarily focused on perceived norms about alcohol use and have found similar results (Borsari & Carey, 2000; Lewis, Neighbors, Oster-Aaland, Kirkeby, & Larimer, 2007; Neighbors, Larimer & Lewis, 2004; Neighbors, Lewis, Bergstrom, Larimer, 2006; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007; Williams, Herman-Stahl, Calvin, Pemberton, & Bradshaw, 2009; Tomaka, Morales-Monks & Shamaley, 2012). Yet there is still a dearth of literature examining other possible mediation effects including alcohol expectancies, readiness to change, and coping strategies. Indeed only two studies have examined these latter factors (Neighbors et al., 2007; Williams et al., 2009) with neither study finding any mediation effects for factors other than descriptive norms.

In its examination of mediational factors, the present study showed significant effects in drinking to cope motives both in alcohol risk levels and alcohol-related problems. In both instances experience of the personalized coping feedback intervention showed increases in the outcomes, not experienced by the other two conditions. One possible explanation for this effect is that coping feedback caused awareness in participants drinking motives to cope. They are more aware now of what drinking to cope is and that they may experience it when drinking. This may suggest a process that may take longer to cause change in drinking related outcomes

where awareness may precede actual decreases.

Unfortunately this study found no support for the theory that adding a stress and coping component to a PNF intervention may increase its ability to reduce consumption as well as increase its ability to affect alcohol-related problems in this sample. Although, this study did find significant correlations among the alcohol related outcomes, the drinking to cope motives, and avoidance coping. The study found a significant increase in drinking to cope motives among participants in the intervention where personalized normative coping feedback was experienced accounted for changes in their alcohol risk levels and alcohol-related problems at follow-up. This finding could reflect a number of things. First, as with alcohol-related problems, drinking to cope may have a late impact on problems. Based on these findings it is clear that the group that received coping feedback became aware of the coping motive to consume alcohol it just may take more time to impact changes. Secondly, perhaps the participants received too much information to process in a group setting. It is possible that in a one on one setting the participant may be able to understand more and possibly feel more comfortable in asking questions about what they do not understand. The message may have gotten lost, they may have received too much novel information, or perhaps the information was confusing to them.

Overall, there were some implementation issues that may have unduly influenced the observed pattern of results. First and foremost was the fact that the conditions were delivered by different individuals. Specifically, research assistants were recruited to help with the number of feedback sessions and as such there may have been different styles of presentation that could affected the message the participants received. There were several possible threats to internal validity which include testing effect (reactive effects of testing), selection bias, and implementation effect. Also statistical issues with the classroom setting may have been more appropriate to use hierarchical level modeling.

Limitations of the Study

Several limitations of the study were expected a priori. First, the length of follow-up in

the current study was only 6-weeks. As such, additional research is needed to determine the long-term impact of the intervention.

Second, like most research in this area, a limitation of the study included the reliance of self-report data of participants. In particular, reports of alcohol and substance use may have questionable reliability and validity. Specifically, participants may understate use, be dishonest, or inaccurate in their reporting of these behaviors. In addition, demand characteristics may have influenced the results in regard to underreporting of alcohol-related behaviors. Even so, as a precaution, the present study used well established instruments that have shown good reliability and validity (Babor & Del Boca, 1992). Further this study examined the degree to which alcohol related outcomes correlated with social desirability. As mentioned previously, Social desirability was controlled for and the results showed little to no differences between measures of social desirability and alcohol related outcomes suggesting that there were no widespread problems with this samples self-reports of alcohol related outcomes and other variables.

Third, the use of large groups was a limitation of the study. Specifically participants in the study were randomized by classrooms. The lack of one-on-one discussion time may have prevented personal goal setting and lessened general interaction with the facilitator. The lack of discussion may also have led to a lack of comprehension further missing an opportunity for contemplation of behavior change. The use of large groups may have also violated the independence of observations.

Fourth, lack of fidelity with the inclusion of both light/ moderate drinkers and nondrinkers may be a limitation to the study. Inclusion of these drinkers may have created the possibility that those students involved in the study were not in as much need of an intervention targeting alcohol use. Including nondrinkers could also limit the study's generalizability.

Fifth, the use of different presenters may also have been a study limitation. The study investigator conducted the sessions for the educational control and the standard PNF plus

coping condition but used a different presenter for the standard PNF condition. As such a difference in trainers, such as gender, level of authority, as well as other differences may have led to different processes underlying the changes seen among the different conditions.

Lastly, generalizability of the sample is also a limitation. Considering the unique population of the University of Texas at El Paso the results may not be generalizable to other university campuses. This population is highly Hispanic and located on the U.S Mexico border, and given UTEP is a commuter school it could be this population is much unlike most college campuses.

Strengths of the Study

Despite these limitations the study had several strengths. First and foremost, the study included a large sample size ($N = 501$) of college students. Secondly, the study included an innovative intervention with an innovative approach. Using a coping feedback component has been suggested in the literature but has not yet been included until now in a brief intervention. Thirdly, the inclusion of social desirability in the study was a strength. The little or no differences found between measures of social desirability and alcohol related outcomes suggests that this sample of college students reports were not unduly influenced by social desirability concerns nor self-deceptive practices. Lastly, this study also provides some evidence that providing PNF in a classroom setting is plausible. As providing PNF has been used individually or in some cases a small group it has not yet shown its effectiveness in large groups until now.

Recommendations for Future Research

There are several recommendations for future studies based on the findings of this study. In terms of the study intervention approach, future studies may benefit from a more targeted study for “at-risk” college students. For example, a more traditional screening approach could be used to eliminate abstainers, light/moderate drinkers, and those with potential dependence, thus allowing the PNF approach to be tested in the population for which

they were intended. As such, in a more traditional approach the coping component could also show more effectiveness in a more personal setting where one can grasp the information being provided better.

Summary and Conclusions

This study investigated if the addition of a coping component to a standard PNF intervention would have a stronger impact on reducing alcohol-related problems and consumption than using a standard PNF intervention. A secondary purpose of the study was to explore if coping mediated program outcomes when information on it was included in a brief PNF intervention. Participants were randomly assigned to one of three conditions, a standard PNF condition, a standard PNF + PCF condition, or an education only control condition. In all three conditions, participants completed the same assessment measures, received one of three interventions, and completed the same follow-up questionnaire within four to six months post-intervention. None of the statistical analyses provided support for the main study hypotheses that (a) participants in the two experimental conditions would show greater decreases in alcohol related outcomes than the educational control condition, which should show little to no change, and (b) that the PNF + PCF condition would show greater decreases than the standard PNF condition. Instead, the results suggested modest decreases in alcohol related outcomes that were relatively equal across all three conditions.

Although the results failed to support the hypotheses, the results of this study are positive from a public health perspective. Specifically, the results suggest that a variety of brief interventions can significantly reduce alcohol-related outcomes in the short term following a brief single session alcohol intervention. However, further research is needed to rule out alternative explanations for the results.

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Appendices

Appendix A

Form of Personalized Normative Feedback Interventions

The studies evaluated have incorporated personalized normative feedback interventions in many different contexts. A first aim of the paper is to summarize studies by form of feedback (i.e., mailed, computer, paper) and summarize the findings of each. All studies had been included in prior reviews. A second aim is to summarize studies by form of enrollment (i.e., recruited, mandated, or volunteer). In addition, any recurring themes will be highlighted and summarized.

Mailed personalized normative feedback interventions

Larimer and Crouce (2002) in their first review suggested that the efficacy of brief interventions with a personalized normative feedback component might be the result of mailed feedback. In addition, two other review studies found more favorable results for written (mailed) and computer-based personalized feedback interventions than for face-to-face interventions (Walters & Neighbors, 2005; White, 2006). In this evaluation of the literature, interventions providing mailed feedback showed mixed results.

Three studies specifically investigated the efficacy of mailed personalized normative feedback interventions and found support in reducing drinking behavior among at-risk drinkers in the short term (Agostinelli, Brown, & Miller, 1995; Collins, Carey & Sliwinski, 2002; Walters, Bennett & Miller, 2000). Two other studies investigated event specific 21st birthday celebration drinking (Lewis, Neighbors, Lee & Oster-Aaland, 2008, & Neighbors, Spieker, Oster-Aaland, Lewis, & Bergstrom, 2005) and another used students with elevated depression scores (Geisner, Neighbors, Lee & Larimer, 2007), none supported reductions in drinking behavior but did see changes in perceptions of typical student drinking behaviors. As such, the efficacy among mailed personalized feedback interventions is mixed.

Agostinelli, Brown, & Miller (1995) recruited at-risk college student drinkers to evaluate

the effectiveness of a mailed personalized normative feedback intervention in reducing alcohol consumption. Students completed questionnaires with detailed information regarding drinking practices and then were randomly assigned to either receive or not receive immediate feedback of drinking relative to popular norms by mail. Those in the feedback condition received personalized information regarding their own weekly average number of standard drinks and level of personal risk for alcohol problem. They also received a comparison of their personal score to population norms. At the end of a 6-week follow-up, students who received mailed personalized normative feedback showed a greater reduction in weekly alcohol consumption and average blood alcohol concentration (BAC) than controls.

Collins, Carey, and Sliwinski, (2002) also intended to examine the efficacy of mailed personalized normative feedback as a brief alcohol intervention for at-risk college drinkers. Participants completed an alcohol-use assessment at baseline and then were randomly assigned to one of two groups, a mailed brief intervention, or assessment only attention control group. The mailed brief intervention group received a two-page personalized normative feedback form consisting of information concerning quantity and frequency of their drinking and alcohol-related problems in conjunction with national normative drinking data based on baseline responses to the drinking measures. The attention control group received a standard psychoeducational brochure about alcohol use. At 6 weeks follow-up, participants in the intervention group reported consuming fewer drinks per heaviest drinking week and experiencing fewer heavy-drinking episodes than controls but findings were no longer evident at 6-month follow-up.

Another similar study evaluating the efficacy of a mailed personalized normative feedback intervention by Walters, Bennett, and Miller (2000) randomly assigned college students in to one of three intervention groups. Participants either received a two-hour information and motivation session plus mailed PF on drinking, a mailed feedback only group and an assessment only no treatment group. The feedback group received information about

the quantity and frequency of consumption, peak weekly and monthly BAC levels, and information on personal risk factors. A significant finding at 6-week follow-up was found for reductions in drinking levels per month from students in the mailed feedback only group. Results also showed decreases in drinking expectancies and alcohol-related problems in both treatment groups about equally but findings were not significant. Overall, results supported the efficacy for mailed feedback on its own as an effective intervention for heavy drinking college students.

Geisner, Neighbors, Lee and Larimer (2007), took a different approach in their mailed personalized normative feedback intervention using college students with elevated scores in depression. They randomized students previously screened on the Becks Depression Inventory into one of two groups. Either an intervention group who received mailed feedback on alcohol use, moderation strategies, and normative information regarding student drinking, personalized feedback on depressed mood, and alcohol use or to an assessment only control group who received only a thank you letter. Results showed significant reductions in perceptions of drinking norms in students receiving feedback compared to controls but no reductions in alcohol consumption or alcohol-related problems in comparison to controls was found.

Two studies took an even different approach evaluating the efficacy of an event specific mailed normative feedback intervention among college students (Lewis, Neighbors, Lee & Oster-Aaland, 2008; Neighbors, Spieker, Oster-Aaland, Lewis, & Bergstrom, 2005). The purpose of both studies was to determine if a 21st birthday specific normative feedback card would reduce 21st birthday drinking and alcohol-related problems. In both studies, half of the participants received a mailed birthday card one week prior to their 21st birthday and the other half did not. All participants returned one week later to complete a survey about their birthday celebration activities. Lewis et al. (2008) found reductions in normative misperceptions of the overestimates of typical students use but did not find reductions in alcohol consumption or alcohol-related problems in comparison to control students who did not receive the card.

Neighbors et al. (2005) found the card had no impact on reducing drinking; those who received the card did not have significantly lower BAC levels than students who did not receive the card.

Overall, findings show mixed results regarding mailed feedback interventions. Findings in support of mailed personalized normative feedback interventions in reducing drinking behavior among at risk drinkers in the short term are provided by Agostinelli, Brown, & Miller, (1995), Collins, Carey & Sliwinski (2002), & Walters, Bennett & Miller (2000). Unfortunately, findings were not evident at the longer-term follow-up; as such results may not endure over a longer period. Geisner, Neighbors, Lee & Larimer (2007), Lewis, Neighbors, Lee & Oster-Aaland (2008) & Neighbors, Spieker, Oster-Aaland, Lewis, & Bergstrom (2005) did not support reductions in drinking behavior but did see changes in perceptions of typical student drinking behaviors. Overall, mailed feedback interventions are better than no feedback.

Written personalized normative feedback interventions

Four studies provided paper feedback (e.g., printout, pamphlet, or leaflet) and took different approaches to personalized normative feedback interventions. Overall, written feedback may not be as efficacious as other forms. Two studies included mandated college students and found efficacious results although researchers noted reductions in alcohol consumption might be attributed to the reprimand rather than the intervention. Two other studies not using mandated students showed only small significant reductions in one aspect of consumption. Further, two of the four studies included a motivational interviewing counseling component and found no additional benefit.

Lysaught, Wodarski, and Parris (2003) randomly assigned volunteer college students, who had experienced problems due to drinking or were interested in learning more about their drinking to one of two conditions, a pamphlet condition-assessment/feedback (AI) or non-pamphlet condition-assessment only (AO). The pamphlet provided specific information on the consequences of alcohol consumption. Researchers wanted to observe the effects of participation on patterns of drinking behaviors, specifically investigating if exposure to a brief

information-based treatment condition led to greater reductions in self-reported drinking behavior and/or greater reductions in positive expectations versus assessment only control group. Results at three-month follow-up found only a significant decrease in the number of drinks consumed in one sitting among the intervention group as compared to controls.

Murphy, Benson, Vuchinich, Deskins, Eakin, Flood, et al., (2004) randomly assigned recruited individuals separately by gender and stratified by drinks per week to a personalized drinking feedback only group or personalized drinking feedback with a 30-50 minute motivational interview group. The study evaluated the efficacy of personalized drinking feedback delivered with and without a motivational interview. Results at 6-month follow-up showed small to moderate reductions in alcohol consumption, reported drinks per week, and frequency of heavy drinking per week for both intervention groups. Women showed greater reductions than men did. The added motivational interview component did not enhance the efficacy of personalized feedback but did prove that personalized drinking feedback delivered without a counseling session can be equally effective.

The last two studies tested written personalized normative feedback interventions among mandated college students. White, Mun, and Morgan (2008) specifically tested whether written feedback interventions are efficacious for mandated students. They further compared short-term (2 month) or longer-term (7 month) effects of an immediate feedback to the effect of a delayed feedback. One group received delayed feedback to test if the intervention had an effect beyond simply being caught and mandated. Results at both follow-ups, among both groups did not differ. There were no differences in the immediate or delayed feedback group. Both groups showed decreased frequency of alcohol use, frequency of heavy episodic drinking and peak BAC levels. Overall, the researchers conclude that written personalized feedback interventions may not be efficacious for mandated students and may work better with volunteer students. It is not clear if it was the incident of being caught and reprimanded or the written feedback that caused reductions in alcohol use. The same researchers as above conducted

another study among mandated students to examine if mandated students would reduce alcohol use more in a written feedback condition only or one with an additional motivational interview condition. Mun, White and Morgan (2009) randomly assigned mandated students to either a either a written personalized feedback condition only or a personalized feedback condition delivered in the context of a brief motivation interview. Results found at 4 month and 15-month follow-up, the majority of students (53.4%) improved in both heavy episodic drinking and alcohol-related problems after the personalized feedback intervention regardless of assignment to an additional MI condition or the written only condition. Here again they could still not conclude if the reprimand or intervention caused reductions in alcohol use.

Written feedback interventions took on different approaches to personalized normative feedback interventions. Overall, written feedback may not be as efficacious as other forms. Two studies included mandated college students and found efficacious results although researchers noted reductions might be attributed to the reprimand. The two other studies not using mandated students showed only small significant reductions in one aspect of consumption. In addition, among two of the studies including a motivational interview-counseling component, no additional benefit was found. As such, other forms of feedback may be better suited for college students.

Computer personalized normative feedback interventions

A third and highly popular form of feedback provided by studies reviewed in this paper are computer feedback interventions. All nine studies found significant decreases in alcohol consumption and three provided additional support for changes in perceived norms. Most computer based feedback studies varied on design. Three studies used heavy drinkers previously screened at pre-intervention assessments, three tested commercially available computer based programs, and two provided gender specific normative feedback. Two others varied greatly. Overall, web-based personalized normative feedback interventions provide the best support for changing alcohol related behaviors at least in the short term.

Three studies (Butler & Correia, 2009; Neighbors, Larimer & Lewis, 2004; and Neighbors, Lewis, Bergstrom, & Larimer, 2006) included college students previously screened in pre-intervention assessment sessions found to be heavy/at-risk drinkers. Butler and Correia (2009) randomized participants to one of three feedback conditions, computerized personalized feedback, personalized feedback delivered face-to-face interaction with a trained clinician, and a no-feedback control group. The study compared the efficacy of the three feedback conditions in reducing alcohol use and related problems among undergraduate college students. At 4 weeks follow-up, they found that both the face-to-face and computerized interventions were equally successful in reducing the quantity and frequency of alcohol consumption and alcohol-related problems. Specifically, both intervention groups were statistically different from the assessment only control group but not significantly different from each other. The study concluded that personalized feedback forms with identical content, but different delivery, have an equivalent effect on patterns of alcohol use.

The latter two studies specifically evaluated the efficacy of personalized normative feedback as a standalone intervention in reducing alcohol consumption among heavy drinking college students. Neighbors, Larimer and Lewis (2004) randomly assigned students to either a computer personalized normative feedback intervention or an assessment only control condition to evaluate the efficacy of a computer-delivered personalized normative feedback intervention in reducing alcohol consumption. Feedback detailed one's own drinking behavior, perceptions of typical student drinking, and typical student drinking. Results found greater reductions in drinking behavior and perceived norms among intervention participants relative to control and illustrated that normative feedback was effective in changing perceived norms and alcohol consumption at 3 and 6 months follow-up assessments.

Neighbors, Lewis, Bergstrom and Larimer's (2006) primary aim was to replicate and extend the findings of Neighbors et al. (2004). Results at two-month follow-up showed students reported drinking fewer drinks per week than controls and the reduction was mediated by

changes in perceived norms. Researchers found that students who received personalized feedback reduced their weekly consumption relative to the no feedback group and found a reduction in alcohol-related negative consequences. The results add to the evidence that personalized normative feedback reduces perceived norms and alcohol consumption. All three studies provided support for computer delivered personalized normative feedback interventions for heavy drinkers.

Three other studies took different approaches to testing commercially available free to the public web-based programs in reducing drinking (Doumas, McKinley and Book, 2009; Walters, Vader & Harris, 2007; Doumas & Hannah, 2008). Doumas et al., (2009) randomized mandated college students to either a web-based personalized normative feedback condition (WPNF) or web-based education (WE) condition. The WPNF condition completed a 15 min online program, www.checkyourdrinking.net, designed to decrease drinking by providing personalized feedback and normative data regarding drinking and associated risks. In the WE condition, participants completed the judicial educator, an educational program for students receiving disciplinary sanctions, at www.reslife.net for 45 minutes. At 30-day follow-up results identified significantly greater reductions in weekly drinking quantity, peak alcohol consumption, and frequency of drinking to intoxication among individuals in the WPNF group than WE controls. The feedback group also reported significantly greater reductions in estimates of peer drinking to follow-up than the assessment only group. The study supports web-based personalized normative feedback as intervention for mandated college student.

Doumas and Hannah (2008) also evaluated the efficacy of the www.CheckYourDrinking.net alcohol web-based personalized normative feedback program among young adults 18-24 years old but in the workplace. Study participants were randomly assigned to one of three conditions, a web-based intervention, or a web-based intervention combined with a 15-minute motivational interview with a counselor to review the feedback, or an assessment only control group. At 30 day follow-up results indicated that individuals in intervention groups

reported significantly lower levels of drinking, frequency to intoxication, and peak consumption than those in the control group. Results indicated there were no significant differences in any areas of drinking between the two groups. As such, the added brief motivational interview did not improve the effectiveness of the web-based program.

Walters, Vader, and Harris (2007) tested the e-CHUG-electronic Check-Up to Go internet program, at reducing drinking among college freshman drinkers. Randomly assigned participants received either personalized feedback or assessment only. The feedback group received a personalized report consisting of a quantity/frequency summary of standard drinks consumed, peak BAC levels, comparison to us college drinking norms, and estimated level of risk among other things, displayed immediately following assessment. Results found at 8-week follow-up significant decreases in drinks per week and peak BAC levels compared to controls but not for alcohol-related problems. At 16 weeks, participants showed no differences in any of the outcomes. At both follow-ups, there were significant decreases in discrepancy of perceived norm estimates, participants did become more accurate in estimating how their drinking compared to others. Overall, both studies provided efficacy for commercially available computer alcohol interventions.

Two other studies (Lewis & Neighbors, 2007; Lewis, Neighbors, Oster-Aaland, Kirkeby & Larimer, 2007) specifically hypothesized that gender-specific personalized normative feedback would be more effective than gender- neutral feedback in reducing alcohol consumption claiming that gender specific information should be perceived as more relevant and therefore be more influential. Both studies randomly assigned student drinkers to one of three intervention conditions, a gender-specific personalized normative feedback condition, a gender-neutral personalized normative feedback condition, or assessment only. Also, in both studies feedback included information regarding personal drinking behavior, personal perceptions of typical student drinking behavior, and information regarding actual norms for typical student drinking behavior. Lewis et al. (2007) included only college freshman and further provide freshman

specific feedback. Lewis et al. (2007) found at three and five-month follow-ups, the gender-specific personalized normative feedback group reduced their drinking frequency a little more than controls but not more than the gender-neutral group. Women reported higher gender-specific norms than men did for drinking frequency. The researchers conclude that overall findings suggest gender-specific feedback may be preferable to gender-neutral for freshmen students because gender specific effects were found for frequency and quantity compared to frequency only among the gender-neutral group. Lewis and Neighbors (2007) results showed at 1-month follow-up that normative feedback was effective in changing perceived norms and reducing alcohol consumption for women and men receiving either form of feedback. Only women in the gender specific feedback condition with higher gender identities reported greater drinking reductions at follow-up. Researchers concluded gender-specific feedback does matter in combination with personal identification with the reference group for women.

Both studies investigating gender specific feedback found some efficacy to providing gender-specific personalized normative feedback in changing alcohol behaviors. While findings were significant, they were small and did not appear to be very noteworthy.

Two more computer-based personalized normative feedback interventions varied widely in design. Neighbors, Lee, Lewis, Fossos and Walters (2009) evaluated whether personalized normative feedback for 21st birthday drinking produced reductions in drinking and social norms. Saitz, Palfai, Freedner, Winter, MacDonald, Lu, et al., (2007) tested two different recruitment strategies and pilot tested two different programs of computer-based brief intervention for college students. Neighbors et al., (2009) randomized participants to either a web-based personalized feedback condition or an assessment only control group. Feedback included information about drinking intentions and expectations for upcoming 21st birthday, BAC levels, normative information, and protective behavior strategies. Results revealed that the intervention was effective at reducing estimated BAC levels among students celebrating their 21st birthday and was particularly effective in reducing estimated BAC levels reached by students who had

intended to reach higher BAC's. In addition, some support was identified for the reduction of normative perceptions for 21st birthday peer drinking behavior. Overall, the study suggests event-specific personalized normative feedback interventions can be effective at reducing heavy drinking among college students during that event.

Saitz et al., (2007) compared two different recruitment strategies, email invitation to a general-health screening or email invitation to an alcohol-specific screening expecting the general health screening to produce a greater response. They also compared two interventions, a minimal brief intervention providing local normative feedback regarding number of drinks per typical week in past month and number of heavy drinking episodes. The more extensive intervention included consequences of drinking reported in last year and a graphic profile of money spent per week on alcohol among many other things. Results indicated similar response rates for both invitations and the more extensive interventions might have had greater efficacy increasing readiness to change drinking particularly in women and intention to seek help particularly in men. The overall findings of the computer based intervention found at one-month follow-up significant decreases in drinks per week, fewer heavy drinking episodes, and increases in readiness to change drinking after brief intervention.

Most computer based feedback studies varied on design. Three studies used heavy drinkers previously screened at pre-intervention assessments, three tested commercially available computer based programs, and two provided gender specific normative feedback. Regardless of design, these studies are consistent with research on college campuses indicating that brief web-based personalized normative feedback interventions are effective in reducing heavy drinking in college students. In this review, all nine studies included showed significant decreases in alcohol consumption and three provided additional support for changes in perceived norms. In most studies, evidence was supported in the short term (< 6 months). Overall, web-based personalized feedback interventions provide the best support for changing alcohol related behaviors at least in the short term.

Enrollment of Personalized Normative Feedback Alcohol Interventions

A second category found across studies is form of enrollment. Studies either used participants recruited through some previous mass screening assessment, students mandated to counseling for violations, or students enrolling because they wanted information on their own drinking behaviors. Overall, form of enrollment proved to be more efficacious among individuals recruited for participation. All studies recruiting participants found reductions in some aspect of drinking behavior. In addition, the six studies investigating perceived norms found significant changes. Among studies using volunteers, event specific interventions (21st birthday) appeared to work best.

Recruited students

The majority of studies recruited participants (mostly college students) through initial mass drinking screening intervention assessment sessions. For example, a majority of Universities offer undergraduate students the opportunity to participate in mass screening for eligibility in a number of current or future studies. A main inclusion criteria among most of the brief personalized normative feedback alcohol interventions is meeting criteria of heavy drinkers (e.g., highest BAC levels, top 11% of drinkers, having 2 or more heavy drinking episodes during previous month) or at least two binge episodes (5 or more drinks male; 4 or more drinks female).

All studies, except for one (Geisner, Neighbors, Lee & Larimer, 2007), showed reductions in some aspect of alcohol consumption. All studies were either mail or computer feedback interventions (Agostinelli, Brown, & Miller, 1995; Butler & Correia, 2009; Collins, Carey, & Sliwinski, 2002;; Lewis & Neighbors, 2007; Lewis & Neighbors and Lewis, Neighbors, Oster-Aaland, Kirkeby & Larimer 2007; Murphy, Benson, Vuchinich, Deskins, Eakin, Flood, et al., 2004; Neighbors, Larimer & Lewis, 2004; Neighbors, Lee, Lewis, Fossos, & Walters, 2009; Neighbors, Lewis, Bergstrom, & Larimer, 2006; Saitz, Palfai, Freedner, Winter, MacDonald, Lu, et al., 2007; Walters, Bennett & Miller, 2000). As such, mail or computer personalized feedback

may be beneficial among recruited participants.

Mandated students

Some studies investigated brief personalized normative feedback interventions among mandated college students. These studies aimed to examine the efficacy of brief personalized normative feedback interventions in reducing heavy drinking and drinking related problems in students referred by counseling services for violating university policy for alcohol or other drugs (Doumas, McKinley & Book, 2009; Mun, White & Morgan, 2009; White, Mun, & Morgan, 2008). In this case, two of three studies supported computer based personalized normative feedback as interventions for mandated college students. Thus, computer personalized normative feedback interventions may be better suited than written forms of feedback among mandated college students.

Volunteer students

Lastly, some studies investigated brief personalized normative feedback interventions among volunteer college students. Students enrolled from flyers or emails targeting individuals who wanted help or were just interested in learning more about their drinking behaviors. Among those studies using purely volunteers, three study's findings supported changes in drinking behaviors (Doumas & Hannah, 2008; Lysaught, Wodarski, & Parris, 2003; Walters, Vader, & Harris (2007). Among the three studies, two used commercially available computer based interventions (Doumas & Hannah, 2008) and Walters et al., 2007). Lysaught et al. (2003) used written feedback. The two studies that did not show reductions in consumption were both event specific 21st birthday interventions using a mailed birthday card (Lewis, Neighbors, Lee & Oster-Aaland, 2008; Neighbors, Spieker, Oster-Aaland, Lewis, & Bergstrom, 2005). As such, volunteer participants may benefit most from computer-based interventions.

Overall, form of enrollment showed more consistent reductions among individuals recruited for participation. All studies recruiting participants through previous mass screening found reductions in some aspect of drinking behavior. In addition, the six studies investigating

perceived norms found significant changes. Among studies using volunteers, event specific interventions (21st birthday) appeared to work best. Although, studies appear to support form of enrollment in the efficacy of personalized normative feedback interventions, there is more support for form of feedback providing the best evidence. Overall, form of enrollment showed support among individuals recruited for participation.

International Personalized Normative Feedback Interventions


Four other interventions conducted outside of the United States were included. One conducted in New Zealand (Kypri, Sunders, Williams, McGee, Langley, Cashell-Smith, et al., 2004) and three conducted in Canada (Cunningham, Koski-Jannes, Wild & Cordingley, 2002; Cunningham, Humphreys, Koski-Jannes, & Cordingley, 2005; and Wild, Cunningham & Roberts, 2006). The studies met inclusion criteria of being brief and provided personalized normative feedback. Overall, similar findings were reported outside of the United States.

For example, students in New Zealand were randomly assigned to a computerized assessment and personalized feedback intervention in the context of a BMI or to a leaflet-only control condition. Students in the intervention significantly reduced their own drinking and related problems relative to controls (Kypri et al.).

Three other studies were conducted in Canada among adults in the general population. One study, randomly assigned individuals to either a control no intervention, personalized feedback only, self-help book only, or both personalized feedback and self-help book condition. People in the combined intervention group reported significantly improved drinking outcomes at 6 months compared to those who received just one or none. There was a lack of significance found for either intervention alone (Cunningham, Koski-Jannes, Wild, & Cordingley, 2002). A second study randomly assigned individuals to a normative feedback intervention or to a normative feedback intervention plus self-help book condition. Participants who received the additional self-help book reported drinking less and experiencing fewer alcohol-related consequences at follow-up as compared to respondents who received only the internet-based

intervention (Cunningham, Humphreys, Koski-Jannes, & Cordingley, 2005). The study does not provide evidence of the efficacy of internet-based interventions in and of themselves and further research on internet interventions is suggested. The third intervention randomly assigned individuals to a mailed brief personalized assessment feedback from the Evaluate Your Drinking self-help pamphlet or no intervention. Those who receive personalized feedback had a 10% reduction in per-occasion binge drinking compared to controls. Research extends evidence on efficacy of brief personalized feedback interventions beyond traditional target populations (college students) to adults' in general drinking population who express interest in receiving alcohol self-help materials (Wild, Cunningham & Roberts, 2006). Thus, evidence supports personalized normative feedback interventions for various target populations and for populations outside of the United States. As such, personalized normative feedback interventions prove highly generalizable.

Appendix B: Personalize Normative Feedback (PNF) Sheet

Personalized Feedback for		Thurston Howell III										
	Your Drinking Patterns	<div style="display: flex; justify-content: space-between;"> <div> <input checked="" type="checkbox"/> Frequency <input checked="" type="checkbox"/> Quantity <input checked="" type="checkbox"/> Percentile Comparison <input checked="" type="checkbox"/> Blood Alcohol Content </div> <div> <input checked="" type="checkbox"/> Calories from Alcohol <input checked="" type="checkbox"/> Financial Cost <input checked="" type="checkbox"/> Alcohol and Academic Performance </div> </div>										
		Fall 2008										
According to the information you gave us, the number of occasions you drank (frequency) was:		2 days a week										
The average amount you drank on each occasion (quantity) was:		19.0 drinks										
Your percentile rank (comparing your drinking pattern to that of other college students) is:		99 %										
Based on your typical drinking pattern in one week, we estimate that in the last year:												
you drank a total of		1983 drinks										
you drank on		29% of all days										
you spent about		5009 hours under the influence										
Your typical (average) blood alcohol level (BAL) was:		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%; text-align: left; padding: 2px;">BAL</th> <th style="text-align: left; padding: 2px;">Effects on the Body</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">0.08%</td> <td style="padding: 2px;">Legally intoxicated</td> </tr> <tr> <td style="padding: 2px;">0.15%</td> <td style="padding: 2px;">Balance and movement impaired, Risk for "blacking" out</td> </tr> <tr> <td style="padding: 2px;">0.30%</td> <td style="padding: 2px;">Many lose consciousness</td> </tr> <tr> <td style="padding: 2px;">0.45%</td> <td style="padding: 2px;">Lethal dose</td> </tr> </tbody> </table>	BAL	Effects on the Body	0.08%	Legally intoxicated	0.15%	Balance and movement impaired, Risk for "blacking" out	0.30%	Many lose consciousness	0.45%	Lethal dose
BAL	Effects on the Body											
0.08%	Legally intoxicated											
0.15%	Balance and movement impaired, Risk for "blacking" out											
0.30%	Many lose consciousness											
0.45%	Lethal dose											
Your highest (peak) blood alcohol level (BAL) was:												
This is how long it would take for your typical (average) BAL to return to 0:		46.0 hours										
This is how long it would take for your highest (peak) BAL to return to 0:		46.0 hours										

Lifestyles



Risks

- ☒ Alcohol-Related Consequences
- ☒ Beliefs
- ☒ Alcohol and Sexual Behavior

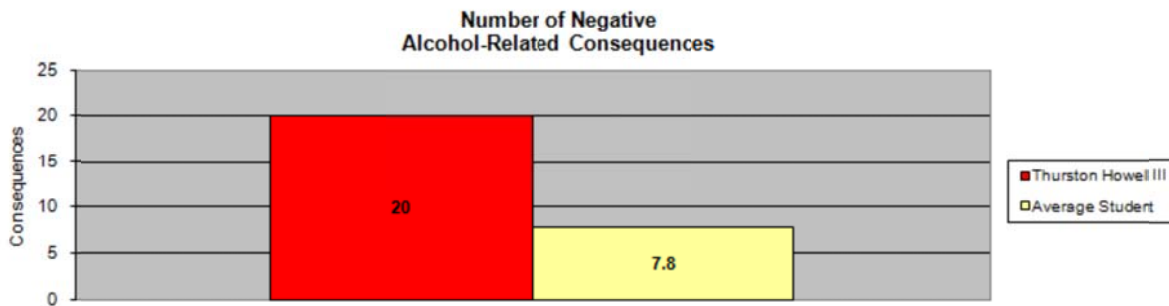
- ☒ Perceived Risk
- ☒ Protective Factors

Alcohol-Related Consequences

You told us that the following alcohol related consequences had occurred at least 3 - 5 times in the prior six months:

Specific Consequences

- Ⓢ Had a fight, argument, or bad feelings with a friend
- Ⓢ Passed out or fainted suddenly
- Ⓢ Suddenly found yourself in a place that you could not remember getting to
- Ⓢ Noticed a change in your personality



Beliefs about Alcohol and its Effects

You listed the following alcohol effects as "Likely to Occur" when you consume alcohol:

- ☒ I would act sociable
- ☒ I would feel self critical
- ☒ It would be easier to express my feelings
- ☒ My responses would be slow
- ☒ I would feel energetic
- ☒ I would act aggressively

Research suggests that many of the social effects of alcohol are based on myths, placebo effects, and the expectations we bring to the drinking situation.

Components of this form have been modeled after those created by the EASICS Program, the Univ. of Washington, and the Yet Center Training Program.

						Perceived Risk	
Your concern about your drinking habits is: MEDIUM							
Based on the information you provided, drinking may be raising some concerns for you at this time. You may be wondering about what changes you can make in your drinking behavior to reduce this concern.							
						Protective Factors	
These are some strategies you might use to reduce the negative effects of drinking:							
<ul style="list-style-type: none"> ➡ Use a designated driver. ➡ Have someone you can call in case no one can drive. ➡ Call a taxi. ➡ Walk ➡ Stay at that location until your BAL drops. ➡ Choose not to drink. ➡ Keep track of how many drinks you are having. ➡ Determine, in advance, not to exceed a set number of drinks. ➡ Switch between alcoholic and non-alcoholic beverages. ➡ Avoid drinking games. ➡ Avoid slamming drinks. ➡ Drink an alcohol look alike (non-alcoholic beer, punch, juice, or water). ➡ Pace your drinks to 1 or fewer per hour. ➡ Learn to monitor your BAL level. 							

Your concern about your drinking habits is: **MEDIUM**

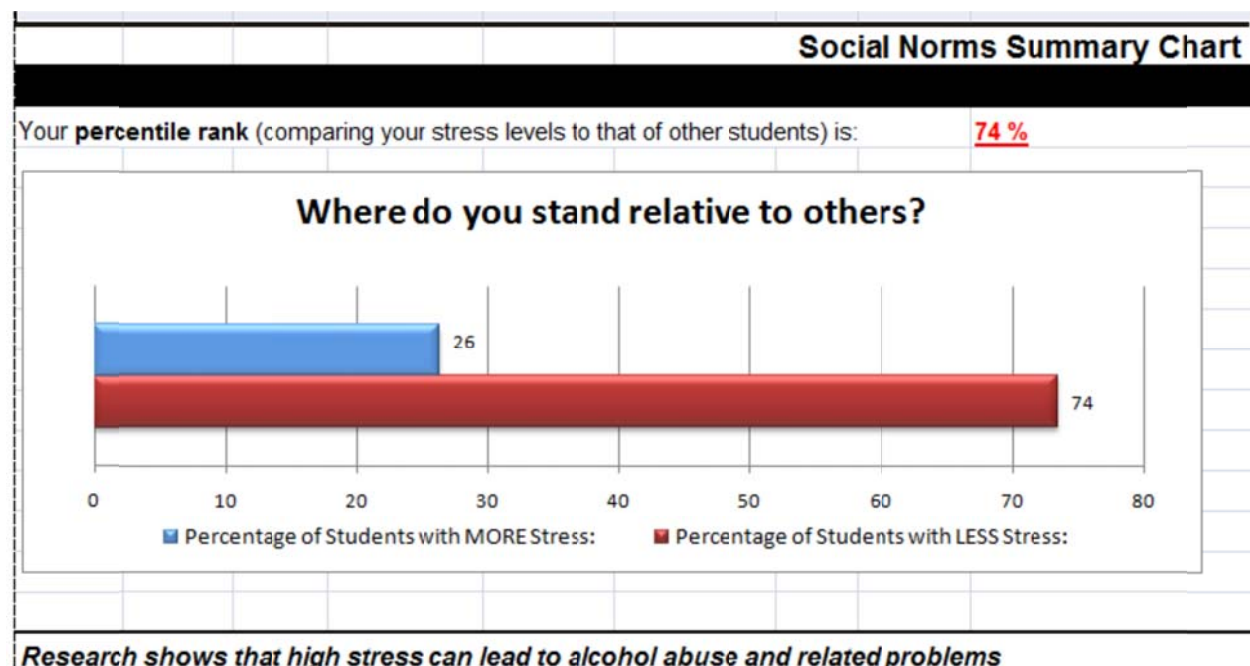
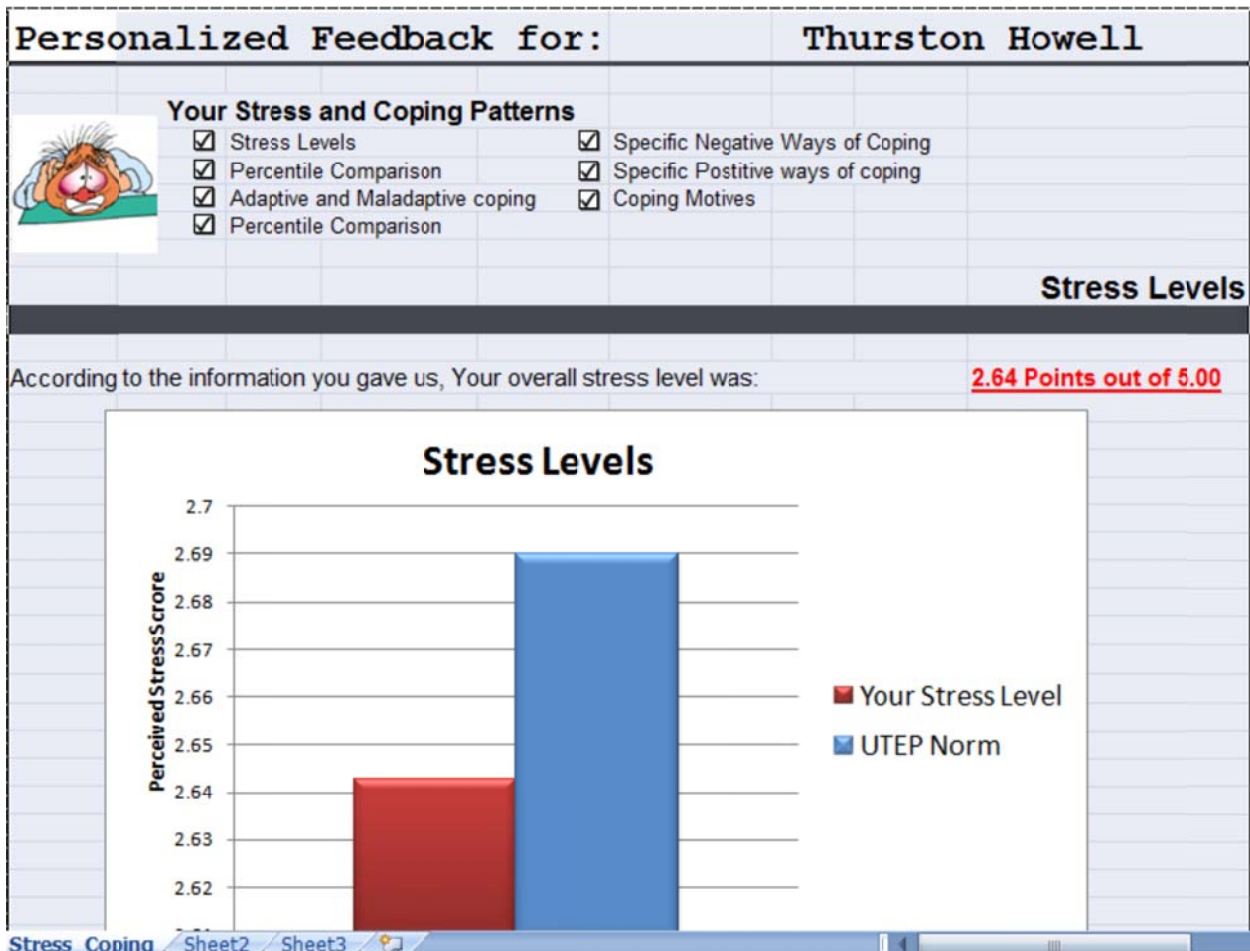
Based on the information you provided, drinking may be raising some concerns for you at this time. You may be wondering about what changes you can make in your drinking behavior to reduce this concern.

Protective Factors

These are some strategies you might use to reduce the negative effects of drinking:

- | | | | |
|---|---|--|--|
| ➡ | Use a designated driver. | | |
| ➡ | Have someone you can call in case no one can drive. | | |
| ➡ | Call a taxi. | | |
| ➡ | Walk | | |
| ➡ | Stay at that location until your BAL drops. | | |
| ➡ | Choose not to drink. | | |
| ➡ | Keep track of how many drinks you are having. | | |
| ➡ | Determine, in advance, not to exceed a set number of drinks. | | |
| ➡ | Switch between alcoholic and non-alcoholic beverages. | | |
| ➡ | Avoid drinking games. | | |
| ➡ | Avoid slamming drinks. | | |
| ➡ | Drink an alcohol look alike (non-alcoholic beer, punch, juice, or water). | | |
| ➡ | Pace your drinks to 1 or fewer per hour. | | |
| ➡ | Learn to monitor your BAL level. | | |

Appendix C: Personalized Coping Feedback Sheet (PCF)



Coping with Stress

There are good (adaptive) and bad (maladaptive) ways of coping with stress:

Adaptive coping means:

Taking action to solve a problem
Making a plan
Getting help (social support)

Maladaptive means:

Using substances like alcohol and drugs to cope
Avoiding or denying the problem
Focusing on and venting angry emotions

According to the information you gave us, your ADAPTIVE coping score was:

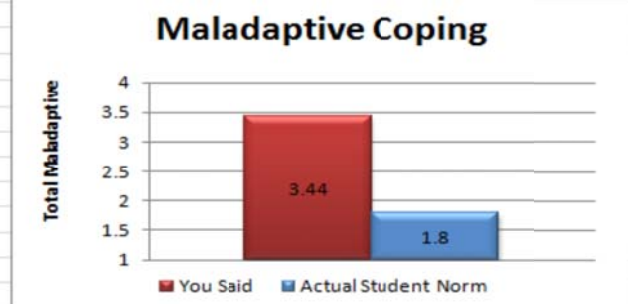
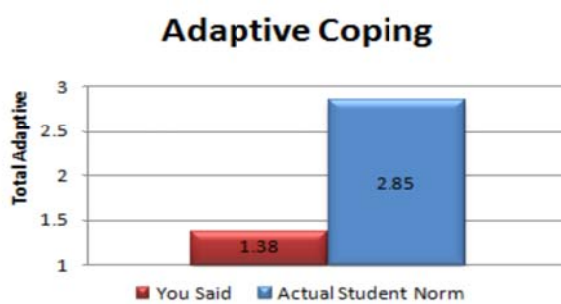
22 out of 48

According to the information you gave us, your MALADAPTIVE coping score was:

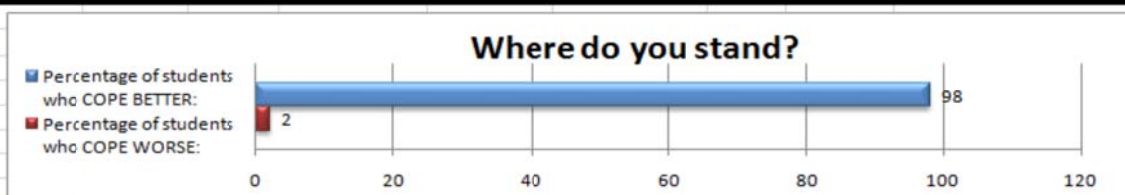
55 out of 48

Coping Norms

Comparison of your Coping to UTEP Norms



Social Norms Summary Chart



Specific Examples

You told us that that these were specific ways that you coped in the last month:

Your Score Adaptive Forms of Coping

1.25	Planning (Made a plan and stuck to it)
1.5	Active Coping
1.25	Positive reinterpretation and growth
1.5	Acceptance

Your Score Maladaptive Forms of Coping

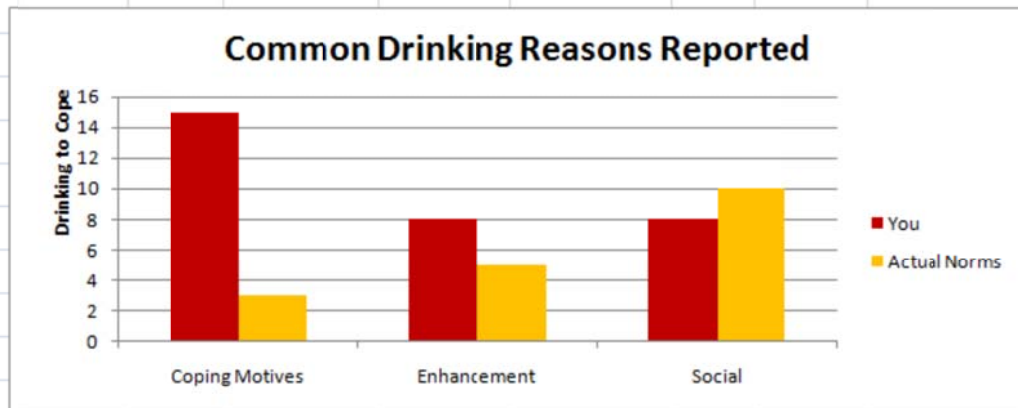
3.5	Substance use coping
3.2	Behavioral disengagement (giving up)
3.1	Denying the is a problem
2.5	Venting of emotions

People who use adaptive forms of coping are happier, more well adjusted, and experience less stress and hardship than those who don't

Coping Motives

Reasons to Drink

Coping	<i>Forget worries and problems, when you're depressed or anxious, feel more sure of self</i>
Enhancement	<i>Exciting, like the feeling, its fun</i>
Social	<i>Be more sociable, celebrate special occasions with friends</i>



Stress and Coping Advice

These are some strategies you might use to manage your levels of stress and as such improve coping:

- Plan, based on calendar and appointment books or simple task lists
- Prioritize activities on a daily basis, assign ratings or align by deadlines
- Set goals
- Have a positive attitude; focus on the positive
- Use positive self-talk or positive affirmations
- Express thoughts and feelings to someone who will listen (family member, friend, counselor...)
- Expand your support network; reinforce friendships
- Add balance to your life, don't overdo studies or play
- Practice relaxation skills; breathing techniques
- Take "time outs"
- Avoid people or situations that stress you out
- Learn how to say "no"; don't take on more than you can handle, know your limits and stick to them
- Take control of your environment;
- Look at the big picture; take perspective of the importance of situations

Thank you!

Angelee Gigi Shamaley, B.B.S, M.S, Ph.D
Biosketch

Angelee Gigi Shamaley received her BBA in Finance and Economics in 2000 from the University of Texas at El Paso (UTEP). She received her MS in Health Sciences in 2004, also from UTEP. In the spring of 2005 she joined UTEP's College of Health Sciences Interdisciplinary PhD program.

Angelee has served as a research assistant/associate since her inception, working with various professors on numerous projects. She has gained research experience through developing a weight management practices scale, collaborating on program evaluation projects and working on alcohol risk reduction interventions among college students.

More specifically, her current doctoral dissertation involved testing an inventive coping feedback component to an established alcohol risk reduction intervention for decreasing alcohol consumption and their related risks (i.e., the BASICS risk reduction program). Her master's thesis (Shamaley, Smith, & Tomaka, 2004), based on a review of the literature on practices for managing weight, involved the unique design of a weight management questionnaire. She is currently working with a team of interested individuals in advancing the scale to a multi-item measure. In addition, she also has research interests in program evaluation and worked as part of a team that conducted program evaluation of several local Community Garden projects that were funded by a local health foundation (i.e., the Paso Del Norte Health Foundation).

Presently, following completion of her doctoral dissertation she intends to submit preliminary data from the results to obtain external funding to support a larger research study investigating the alcohol and coping intervention. She is also continues to extend

the research accomplished through her master's thesis towards advancing the field of eating disorder risks through validating and publishing the multi-item measure for the investigation of weight management practices.

Overall, her work has been disseminated through presentations and publications. She has 2 peer-reviewed publications, is co-author on several others, and has 2 more in review. She also has 3 published abstracts with 6 conference presentations, and has been co-author on 4 more. Her major research interests include regional Hispanic health disparities, personality and social factors of health, and adapting Screening and Brief Interventions (SBI) to multiple risk behaviors. Throughout these accomplishments she started a family and has two sons ages 6 and 4.

Angelee's dissertation entitled "Can Coping Information Enhance the Effectiveness of a Personalized Normative Feedback Intervention" was supervised by Dr. Joe Tomaka.