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## Family history of alcohol abuse moderates effectiveness of a group motivational enhancement intervention in college women

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### ABSTRACT

This study examined whether a self-reported family history of alcohol abuse (FH+) moderated the effects of a female-specific group motivational enhancement intervention with first-year college women. First-year college women ( $N=287$ ) completed an initial questionnaire and attended an intervention ( $n=161$ ) or control ( $n=126$ ) group session, of which 118 reported FH+. Repeated measures ANCOVA models were estimated to investigate whether the effectiveness of the intervention varied as a function of one's reported family history of alcohol abuse. Results revealed that family history of alcohol abuse moderated intervention efficacy. Although the intervention was effective in producing less risky drinking relative to controls, among those participants who received the intervention, FH+ women drank less across five weeks of follow-up than FH- women. The current findings provide preliminary support for the differential effectiveness of motivational enhancement interventions with FH+ women.

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### 1. Background

Although research on college drinking has received considerable attention in recent years, intervention studies have not examined the potential genetic factors that may moderate higher drinking levels. Heavy episodic drinking is considered the leading public health concern on college campuses and the increased drinking levels of college women are of particular concern (NIAAA, 2002b; Wechsler & Kuo, 2000). Among college women, increases have been noted in frequency of drinking, number of lifetime drinks, and likelihood of becoming alcohol dependent (Grant, 1997; Holmila & Raitasalo, 2005; Keyes, Grant, & Hasin, 2007). Recent studies have reported that college women continue to be at increased risk for negative alcohol-related consequences including health problems, sexual assault, and alcohol dependency, due to their high levels of alcohol consumption. Further, because women metabolize alcohol at slower rates than men (even at similar levels of consumption and holding weight constant) and have fewer alcohol metabolizing enzymes (alcohol dehydrogenase), they will become intoxicated more quickly than a man and remain intoxicated for a longer period of time (Baraona, Dohmen, Pozzato, & Lieber, 1998; NIAAA, 2002a). Thus, college women's drinking is an important area for further examination and determining potential moderating variables may help create effective interventions.

Further, intervening with college women may be particularly important during the transition to college. A longitudinal study of 1220 girls passing from elementary school through college found that the

greatest increases in alcohol use and heavy episodic drinking takes place between senior year in high school and freshmen year in college. Also, research supported by the National Institute of Alcohol Abuse and Alcoholism has labeled the first six weeks in college as a critical period in which students may develop risky drinking habits and patterns that can persist throughout college (NIAAA, 2002a). Under-age drinking is typically acceptable within the college culture, and alcohol is readily available and at the forefront of social life. The pervasiveness and popularity of alcohol at social gatherings may be particularly appealing to first year women since establishing relationships is thought to be a fundamental component of female identity and positive sense of self (Gleason, 1994). Thus, it may be crucial to intervene with students, particularly women, at the beginning of their college experience.

The National Institute of Alcohol Abuse and Alcoholism (NIAAA, 2002a) notes strong evidence supporting the effectiveness of interventions that simultaneously address alcohol-related attitudes and behaviors, use survey data to counter students' misconceptions about peers' attitudes regarding drinking and drinking practices, and increase students' motivation to change their drinking habits. Programs that combine these approaches have proven the most effective in reducing problematic drinking among heavy drinkers (Barnett et al., 2004; LaBrie, Lamb, Pedersen, & Quinlan, 2006; Larimer & Cronce, 2002; Perkins, Haines, & Rice, 2005; Walters & Neighbors, 2005; White et al., 2006).

Previous intervention studies have successfully incorporated Motivational Interviewing (MI) (Miller & Rollnick, 2002) — a non-confrontational and non-judgmental therapeutic style of interaction, which is directed at expressing empathy, developing discrepancy, rolling with resistance, and supporting self-efficacy — into interventions that attempt to reduce heavy alcohol consumption (Miller, Benefield, &

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Tonigan, 1993). LaBrie and colleagues developed and examined the efficacy of a brief, one-session female specific group motivational enhancement intervention in two cohorts of college women (LaBrie et al., 2008; LaBrie, Thompson, Huchting, Lac, & Buckley, 2007). The intervention included components derived from MI as well as a discussion of female specific reasons for drinking. This style of interaction may be particularly effective with college students because it meets students where they are with respect to their readiness to change and promotes a non-demanding, non-confrontational style of interaction that allows persons to develop their own personal reasons for change (Budd & Rollnick, 1996; Miller et al., 1993; Rollnick, Heather, Gold, & Hall, 1992).

A potential moderator of intervention efficacy with college students that has remained largely unexamined is the presence of a family history of alcohol abuse. Those students who report having a family history of alcohol abuse among their relatives (FH+) may have prior experience and knowledge about the negative aspects of alcohol use that would make an intervention session more meaningful. Whether direct or indirect, exposure to negative alcohol-related events has been shown to promote awareness and motivate readiness to change (Barnett, Goldstein, Murphy, Colby, & Monti, 2006; Barnett et al., 2002; Sentell, 2008), a central component of successful motivational intervention (Miller & Rollnick, 2002). These women may also engage more frequently in discussion during a group, may be better equipped to weigh the pros and cons of drinking, and may be more accepting of the occurrence of alcohol-related problems among their peers.

Further, since alcohol problems usually cluster within families (Casswell, Pledger, & Pratap, 2002; Chalder, Elgar, & Bennett, 2006; Hartman, Lessem, Hopfer, Crowley, & Stallings, 2006; Kushner & Sher, 1993; McGue, Sharma, & Benson, 1996) and having a family history makes one more likely to develop dependent drinking patterns (Bucholz, Heath, & Madden, 2000; Crum & Harris, 1996), FH+ women may be particularly in need of and receptive to interventions that aim to minimize drinking (Hansson, Rundberg, Zetterlind, Johnsson, & Berglund, 2006). The widespread alcohol codependency movement has contributed to the pathologizing of risk by relation, thereby enculturating the need for family history positive individuals to self-label as such (Asher & Brissett, 1988; George, La Marr, Barrett, & McKinnon, 1999; Gierymski & Williams, 1986). Identifying oneself as FH+ may indicate that a participant recognizes not only her heightened risk for alcohol dependence, but her need to develop healthy drinking-related behaviors as well. For these reasons, examining intervention efficacy among women with and without a family history of alcohol abuse may further increase our understanding of the ways in which an intervention can be effective for individuals with different backgrounds.

The current study examines whether a self-reported family history of alcohol abuse moderates the efficacy of a group motivational enhancement intervention with first-year college women. The efficacy of this intervention has been previously documented both in the current sample (LaBrie et al., 2008) and in another sample of first year college women (LaBrie et al., 2008). We believe that the small group setting with female peers may evoke greater involvement among family history positive women, who may be more attuned to the specific situations in which their peers are involved with alcohol. Further, because of their experience, family history positive women may find the group discussion about negative outcomes and female-specific reasons for drinking more relevant and credible. Thus, we expect that women with a family history of alcohol abuse will respond more positively to the intervention by reducing their levels of drinking, compared with women who do not report a family history of alcohol abuse.

## 2. Method

### 2.1. Participants

During the first two weeks on campus in the Fall of 2006, 287 first-year college women completed an initial questionnaire and attended

either one of 14 intervention group sessions ( $n=161$ ; 56%) or 11 non-intervention control groups ( $n=126$ ; 44%). Groups were held in the Student Life Center on campus. Participants averaged 17.93 ( $SD=0.31$ ) years of age. Participants were 57.5% White/Caucasian, 13.0% Hispanic/Latino, 10.5% Asian/Pacific Islander, 10.2% "more than one race," 5.3% Black/African American, 3.5% reported other or declined to state. Data from the Registrar's office reveals that the ethnic representation of the participants mirrored the make-up the first year class with the exception of Hispanic/Latinos who were underrepresented in the sample.

### 2.2. Design and procedure

During the Fall of 2006 incoming first year college women ( $N=660$ ) received letters inviting them to participate in a research study on "women's values and attitudes on drinking". Two weeks into their first semester, each of these females was sent an e-mail requesting her participation. If the student agreed to take part in the study, she clicked on a link and electronically "signed" a local IRB-approved informed consent form before completing an online baseline questionnaire. At the end of the survey, participants were presented with a screen which asked them to select a group to attend. The groups were randomly assigned to be intervention or control groups and participants selected their group blind to group status. All available spaces in the intervention and control groups for the larger study were filled after three days of opening the survey and recruitment was shut down. Thus, the 287 participants represent those who completed the survey in the first three days and made up 43% of the freshmen women on campus. The groups took place within 2 weeks of completing the baseline survey and are described below. Following their group meetings, participants received weekly online drinking diaries that were used to assess post-intervention behavior. Participants received a nominal stipend for completing the baseline survey and attending their group (\$40) and for completing each post-intervention weekly diary (\$10 per diary). Retention rates were high, with 92.9% of control and 91.3% of intervention group participants completing measures at all time points.

### 2.3. Measures

#### 2.3.1. Family history of alcohol abuse

Assessed only at baseline, each participant was asked which, if any, of her "biological relatives (mother, father, grandmother/grandfather, uncle/aunt, cousin, sibling) had a history of alcohol abuse." For each of these family members, participants subjectively ascertained the presence or absence of familial alcohol abuse. Research supports that the likelihood of alcohol dependence is significantly increased among persons who have reported alcohol problems in first, second, and third degree relatives (Dawson, Harford, & Grant, 1992). Thus, participants who indicated one or more relatives with alcohol problems were classified as family history positive (FH+), whereas participants who indicated no relatives with alcohol problems were classified as family history negative (FH-). A similar method of collecting self-report data on family history of alcohol abuse has been successfully developed and used by Miller and Marlatt (1984). This measure asks "To your knowledge, do you have any biological relatives that have a significant drinking problem — one that should or did lead to treatment?" In their study, a list of a potential 14 relatives is then provided for participants to respond with a *yes* or *no*. Although the question used in the current study varies slightly, it represents the same construct as used previously by Miller and Marlatt.

#### 2.3.2. TLFB alcohol use

Each group (intervention and control) began with the completion of a Timeline Followback (TLFB; Sobell & Sobell, 1992) assessment of drinking behavior over the three months prior to the intervention. As

participants were completing the TLFB, they were not aware of whether they were going to receive an intervention or not. They were instructed to construct their TLFB individually, although the directions were given in the group. To increase memory for drinking events over the three-month period, each participant identified personal “marker” days, or significant events, such as vacations, sporting events, visitors, parties, and birthdays. Using the marker days and drinking patterns to aid in recall, participants went back, day-by-day, through their calendar, writing in the number of drinks consumed each day they drank. This group TLFB assessment has been shown to be as reliable and valid as single item self-reports of behavior and as reliable and valid as the previously validated individual TLFB (LaBrie, Pedersen, & Earleywine, 2005; Pedersen & LaBrie, 2006). Responses for the past 30 days were summed together to create drinks in the past month, maximum drinks, and binge episodes (drinking four or more drinks in one setting) variables used in the analyses.

### 2.3.3. Follow-up drinking diaries

All participants completed weekly online drinking diaries for the 5 weeks following the group session. Each week, participants were sent emails containing a link to the online diary, which asked them to record the number of drinks they consumed each day in the past week. Total drinks per week, maximum drinks, and binge episodes were calculated for each week.

## 2.4. Intervention and control conditions

### 2.4.1. Intervention group

A detailed description of the intervention can be found in LaBrie et al. (2008). The intervention groups were facilitated by research assistants trained in MI (Miller & Rollnick, 2002). Upon arrival, participants received and acknowledged assurances of confidentiality of their responses. Intervention sessions began with the TLFB assessment and then continued with several other tasks for the remaining 90 min. After the TLFB, facilitators asked participants to reflect on and share any patterns or surprises they noticed in their drinking. Group facilitators then moved on to a discussion of the “good” and “not so good” aspects of drinking with the participants, in addition to inquiring on women's expectancies about drinking. Following this discussion, facilitators presented participants with normative drinking data about women in their university as part of the effort to correct overestimations of drinking on campus. Next, the facilitators led a discussion about the inherent physiological differences between males and females in relation to alcohol, as well as how alcohol affects a woman's body. During this discussion facilitators passed around a box of gender and weight specific BAC cards. Facilitators highlighted key points on the cards as well as how to read and use the cards. Information about the effects of alcohol, specifically as a biphasic drug, was discussed and illustrated. Facilitators then invited participants to engage in an open-ended discussion of female-specific reasons for drinking. Finally, as a group, the participants generated reasons for and against drinking less than they do now and set an individual behavioral goal for how they intended to drink in the next 30 days which they shared with the group.

### 2.4.2. Control group

During the 30-minute control group sessions, participants completed a similar TLFB as those in the intervention groups. After the TLFB, there was no discussion or interaction between the facilitators and the group. Participants were simply given a flyer containing general alcohol information and reminded about the follow-up assessments.

## 2.5. Analytic plan

Descriptive statistics concerning pre-intervention drinking were first inspected. Next, we examined the percentage of relatives for each

participant who had a history of alcohol abuse. Finally, using repeated measures models across 5 weeks post-intervention, we assessed whether differences in efficacy between the control and intervention groups was moderated by family history, controlling for TLFB pre-intervention drinking.

## 3. Results

### 3.1. Drinking descriptive statistics

Control group participants averaged 14.16 (SD=22.31) drinks per month, 3.53 (SD=3.89) maximum drinks on any occasion, and experienced 1.85 (SD=3.20) binge episodes in the past month prior to entering the study; while intervention group participants averaged 18.71 (SD=27.17) drinks in the past month, 4.10 (SD=4.45) maximum drinks, and 2.48 (SD=4.12) binge episodes. As expected, no significant differences on the pre-intervention TLFB drinking variables were exhibited between the control and intervention conditions, all were *ns*.

FH+ participants averaged 18.07 (SD=26.70) drinks per month, 3.92 (SD=4.16) maximum drinks per occasion, and 2.38 (SD=4.07) binge episodes; FH- participants had a mean of 16.63 (SD=27.65) drinks in the past month, 3.82 (SD=4.26) maximum drinks, and 2.13 (SD=3.54) binge episodes. No significant differences emerged between FH+ and FH- participants on the pre-intervention TLFB drinking variables, all were *ns*.

### 3.2. Family history descriptive statistics

Control participants on the pre-intervention questionnaire reported that the following family members have “a history of alcohol abuse”: 3.2% mother, 14.3% father, 27.0% grandmother/grandfather, 23.0% uncle/aunt, and 4.0% cousin, and 2.4% sibling. Similarly, intervention participants reported the following family members as having experienced a history of alcohol abuse: 4.4% mother, 11.3% father, 25.8% grandmother/grandfather, 21.4% uncle/aunt, 6.9% cousin, and 5.0% sibling. According to Z-tests of independent proportions, the proportion of each relative abusing alcohol did not significantly differ between the control and intervention, all were *ns*. As mentioned previously, participants were classified as either FH+ or FH- if they reported one or more family members as having a history of alcohol abuse. Consequently, 41.3% ( $n=52$ ) and 41.0% ( $n=66$ ) of participants in the control and intervention groups, respectively, were classified as family history positive,  $Z=.17$ , *ns*.

### 3.3. Main analyses

#### 3.3.1. Moderation of intervention efficacy

To investigate whether the effectiveness of the intervention varied as a function of one's reported family history of alcohol abuse, three 2 (family history) × 2 (treatment) × 5 (time) repeated measures ANCOVA models were estimated. The pre-intervention TLFB measures (drinks per month, maximum drinks, and binge episodes) served as the covariates to account for prior drinking levels. Treatment (intervention vs. control) and family history (positive vs. negative) were the between-subjects factors. Behavioral outcome measures were drinks per week, maximum drinks, and binge episodes — assessed post-intervention across all 5 weeks, the within-subjects factor.

Results revealed treatment main effects on drinks per week,  $F(1, 257)=5.68$ ,  $p<.05$ , maximum drinks,  $F(1, 257)=5.68$ ,  $p<.05$ , and binge episodes,  $F(1, 257)=5.59$ ,  $p<.05$ . Family history and time main effects were not statistically significant. Consistent with our hypotheses, treatment × family history interaction effects were evidenced on drinks per week,  $F(1, 257)=10.35$ ,  $p<.01$  (Fig. 1), maximum drinks,  $F(1, 257)=13.35$ ,  $p<.001$  (Fig. 2), and binge episodes,  $F(1, 257)=19.11$ ,  $p<.001$  (Fig. 3). There were no other two-way or three-way interactions, all were *ns*.

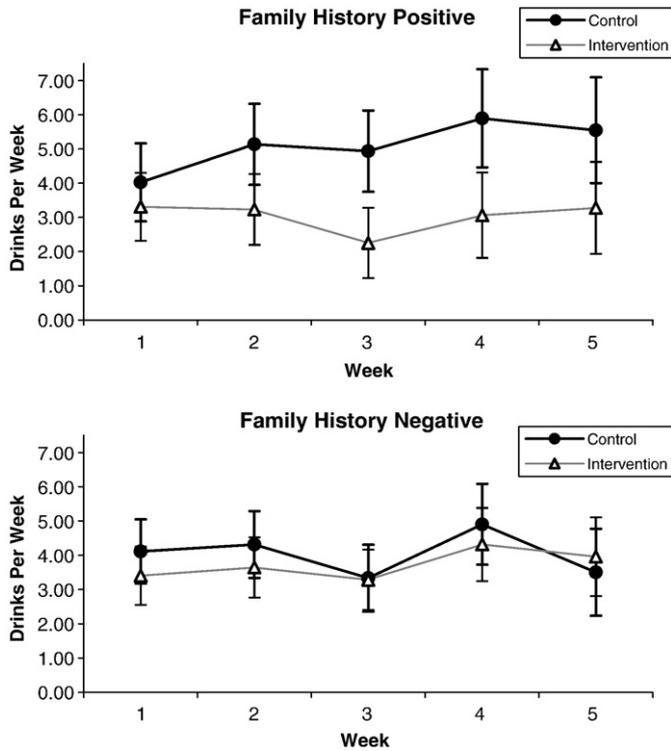


Fig. 1. Family history moderating the effectiveness of the intervention on drinks per week. Note. Estimated marginal means (with 95% confidence interval) controlling for TLFB covariates.

3.3.2. Decomposition of interactions

To decompose the efficacy of the treatment as a function of each family status grouping, 2 (treatment)×5 (time) repeated measures ANCOVA

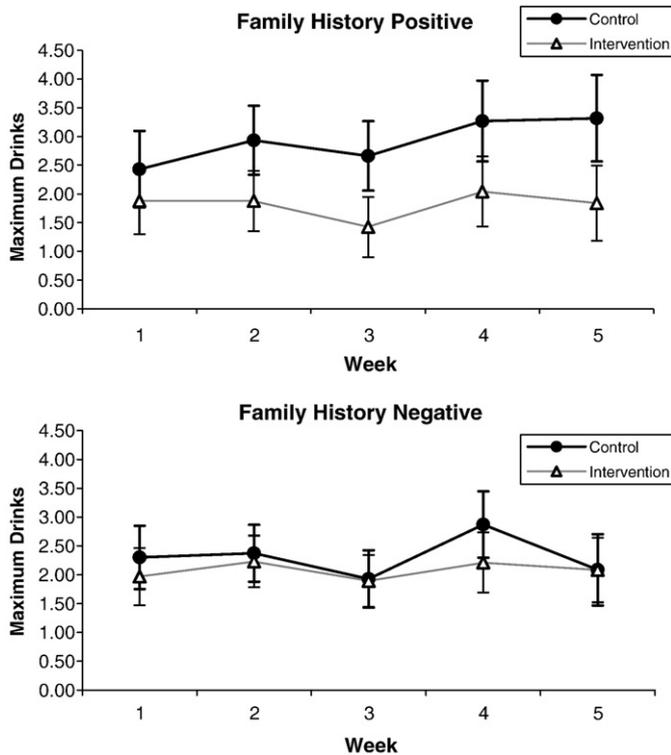


Fig. 2. Family history moderating the effectiveness of the intervention on maximum drinks. Note. Estimated marginal means (with 95% confidence interval) controlling for pre-intervention drinking.

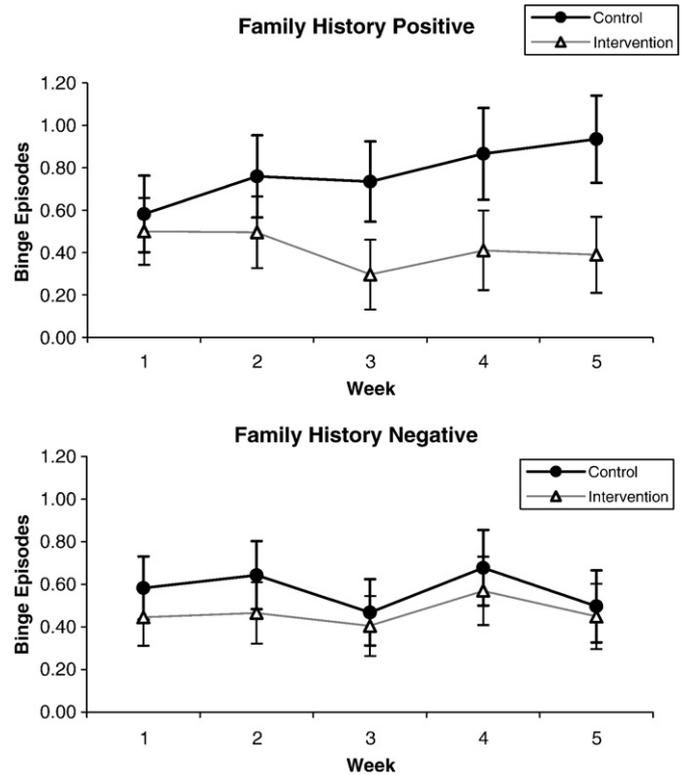


Fig. 3. Family history moderating the effectiveness of the intervention on binge episodes. Note. Estimated marginal means (with 95% confidence interval) controlling for pre-intervention drinking.

models were estimated, with the TLFB measures covaried. This was performed separately for FH+ and FH- participants. When selecting only family history positive participants – results confirmed that the intervention, in contrast to the control, group consumed fewer drinks per week,  $F(1, 104) = 14.08, p < .001$ , maximum drinks,  $F(1, 104) = 12.41, p < .001$  and engaged in fewer binge episodes,  $F(1, 104) = 13.98, p < .001$ . When selecting only the family history negative participants, however – no statistically significant differences emerged between the intervention and control groups on any of the three drinking outcomes, all were *ns*. These moderating effects highlight that the intervention was more efficacious among family history positive, rather than negative, participants in lowering alcohol consumption of drinks per week (Fig. 1), maximum drinks (Fig. 2), and binge episodes (Fig. 3).

4. Discussion

The current study examined the role of self-reported family history of alcohol abuse in moderating the efficacy of a previously validated female-specific group motivational enhancement intervention among first-year college women. Consistent with our hypotheses, family history status moderated intervention efficacy such that FH+ females who attended the intervention exhibited significantly lower levels of alcohol consumption (as measured by drinks per week, maximum drinks per occasion, and heavy episodic drinking) than FH+ control group participants over five weeks post-intervention ( $p < .001$ ). Further, despite main effects of intervention efficacy across all participants (LaBrie, Huchting et al., in review), there were no significant differences in follow-up drinking between FH- intervention and control participants. Thus, the findings suggest that FH+ women were more responsive to the female-specific motivational enhancement intervention. This appears to be the first study showing that interventions with college students may be differentially effective for those with a history of familial alcohol misuse compared to those without such a history and highlights the need to design and implement

interventions that are effective with both family history positive and negative students.

The positive impact that this group motivational enhancement intervention had on FH+ women is a particularly valuable finding in light of recent data revealing significantly riskier natural drinking patterns among FH+ women in their first-semester of college women than their FH- peers (LaBrie, Kenney, Lac, & Migliuri, 2009). If FH+ college women are in fact predisposed to risky alcohol use upon entering college, the need for efficacious interventions is imperative. The differential success of the group motivational enhancement intervention suggests that individuals with a positive family history for alcohol abuse prior to college may develop unique psychosocial perspectives that make them more receptive to such interventions. Women with family histories of alcohol abuse may benefit most from interventions since exposure to familial alcoholism, whether direct or indirect, is likely to instill in individuals a critical self-awareness regarding alcohol abuse and its associated ramifications (George et al., 1999; Sentell, 2008). In contrast, FH- women who are less familiar with dysfunctions of alcoholism may have a tendency to perceive their drinking behaviors as benign and normative, and thus not in need of modification. Consequently, it is likely that those participants who self-labeled as FH+ viewed their own past drinking, as well as future drinking-related risks, as more problematic than FH- individuals despite comparable levels of pre-intervention alcohol usage. Since MI-based interventions attempt to raise participants' awareness of risky drinking in order to motivate change, it is possible that family history positive participants would be primed to modify their drinking behaviors accordingly.

Further, it is important to note that this was a prevention study done at the beginning of the college experience. As noted earlier, this is a critical high risk time in the development of risky drinking. Since the intervention was conducted during the first weeks of college, the women may not yet have been well integrated into social drinking groups. While it is possible that a group prevention effort may have iatrogenic effects (such as forming a cohesive group around drinking), it is likely that the content and style of the group promoting greater mindfulness of alcohol use and issues and built motivation for negotiating future social settings with lower risk. For example, the increased autonomy and self-exploration that coincide with the transition to an alcohol-pervasive college environment may present an ideal opportunity for FH+ women already primed to alcohol issues to develop the motivation and skills to resist the temptations of alcohol. Self-reflective preventative interventions that take place shortly after matriculation and advocate personal agency may be compelling for these women.

Finally, the empathetic, non-judgmental nature of the MI-based group interventions may be particularly appropriate for a FH+ woman who may feel shamed or anxious about her genetic predisposition to alcohol abuse. Because having a problem with alcohol may carry a social stigma, interventions may provide a newfound forum for FH+ women to discuss attitudes, pressures, and risks associated with alcohol use among peers. Further, the MI-based atmosphere may prove to be an outlet for a FH+ woman anxious about alcohol issues and encourage introspective contemplation regarding her own experience with alcohol, which may lead to positive change.

#### 4.1. Limitations

The generalizability of our study is limited in several ways. First, as students at a four year college, the FH+ women in the present analysis are likely to be accomplished and high functioning individuals who may not represent the wider range of women who have a family history of alcohol abuse. Our sample of FH+ college women is potentially different in many aspects, such as socio-economic status, family background, personality characteristics and academic aspirations, as compared to FH+ women who do not attend college. Therefore, it is important to note that some of these qualities may have bolstered intervention success in

our current sample. To circumvent potential sample bias and offer more heterogeneous analyses, forthcoming studies should compare the efficacy of interventions across socioeconomic status and among women who do not attend college. Additionally, future studies should include male participants to determine if gender interacts with intervention success.

Another limitation of the present study is the use of one, nonspecific classification of FH+. Rather than partitioning women into separate groups based on the specific family members reported, family history positive status reflected all potential combinations of familial alcohol abuse. Sample size restrictions prevented us from analyzing subgroups by reported family member. However, the manner in which the current study has classified FH+ participants is compatible with research showing that persons with any blood relative(s) will be differentially impacted by these genetic ties to alcohol abuse (Berkowitz & Perkins, 1988; Bohman, Sigvardsson, & Cloninger, 1981; Zhang, Welte, & Wiczorek, 1999). Nonetheless future researchers may benefit from distinguishing first, second and third degree affiliation to alcohol abuse (e.g. parent vs. grandparent or aunt/uncle), gender of the relative with alcohol problems (e.g. mother vs. father), or whether an individual has more than one family member with an alcohol problem.

A third limitation in the current study is the use of self-report data, as students may not accurately report information regarding their substance use. However, confidentiality of participants' responses was assured, and previous research suggests that self-report of drinking behavior is generally accurate under these conditions (Babor, Steinberg, Anton, & Del Boca, 2000; Chermack, Singer, & Beresford, 1998). Finally, although our study offers important insight over five weeks of intervention and control participants' prospective drinking behavior, future analyses may benefit from examining post-intervention drinking patterns over a longer period of time. Because the ultimate goal of such interventions is to reduce risky alcohol consumption and mitigate alcohol-related consequences, the durability of intervention outcomes is relevant. Moreover, given FH+ individuals' high risk for enduring alcohol problems, longitudinal studies that incorporate periodic and consistent follow-up interventions appear warranted. Nonetheless, it is important that the intervention successfully prevented FH+ women from developing heavy drinking patterns during the critical high-risk transition period into college.

#### 4.2. Conclusions

In conclusion, the current project, which found a MI-based preventative intervention to be effective in the subgroup of FH+, but not FH- first-year college women, provides support for use of motivational enhancement interventions targeted toward FH+ women. These findings corroborate research that advocates the importance of early identification and communication with FH+ college women. The success of the present intervention with FH+ female students is encouraging since this group is susceptible to alcohol abuse and dependency (Mellott & Swartz, 1998; NACOA, 1987; Pullen, 1994). However, more research is needed to determine why such clear differences between FH+ and FH- college females emerged and how best to intervene with FH- women. Further, future research should examine if family history of alcohol abuse functions similarly in college men and students in years subsequent to freshman year in moderating treatment efficacy. Nonetheless, nonjudgmental and non-coercive group motivational enhancement interventions that take place early in the first-year of college and target women transitioning to college produce less risky drinking in women with a family history of alcohol abuse.

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