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Discrimination and Alcohol-Related Problems among College Students: A Prospective Examination of Mediating Effects

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Abstract

Background—Discrimination is a risk factor for health-risk behaviors, including alcohol abuse. Far less is known about the mechanisms through which discrimination leads to alcohol-related problems, particularly during high-risk developmental periods such as young adulthood.

Methods—The present study tested a mediation model using prospective data from a large, diverse sample of 1,539 college students. This model hypothesized that discrimination would be associated with established cognitive (positive alcohol expectancies) and affective (negative affect and coping motives) risk factors for alcohol-related problems, which would account for the prospective association between discrimination and alcohol problems.

Results—Structural Equation Modeling indicated that discrimination was associated cross-sectionally with negative affect and more coping motives for drinking, but not with greater alcohol expectancies. Coping motives mediated the prospective relationship between discrimination and alcohol-related problems. Additionally, results indicated significant indirect effects from discrimination to alcohol-related problems through negative affect and coping motives. These associations were evident for multiple groups confronting status-based discrimination, including women, racial/ethnic minorities, and lesbian/gay/bisexual individuals.

Conclusions—This study identified potential affective mechanisms linking discrimination to alcohol-related problems. Results suggest several avenues for prevention and intervention efforts with individuals from socially disadvantaged groups.

Keywords

discrimination; alcohol-related problems; coping motives; alcohol expectancies; negative affect; college students

1. Introduction

The role of stress in the etiology of psychopathology (Brown, 1993; Dohrenwend, 2000) and substance use and abuse (Dawson et al., 2005; Hasin et al., 2007a) has been well documented. Discrimination has been recognized as one of the most important stressful life

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experiences that serve as risk factors for mental health problems (Kessler et al., 1999). Although the majority of this research has focused on symptoms of psychological distress, there is accumulating evidence that discrimination may also contribute to the development of health-risk behaviors, including alcohol use and problem use, which refers to a pattern of consumption resulting in negative consequences (White and Labouvie, 1989). Indeed, cross-sectional studies of adults have documented associations between discrimination and alcohol use and problem use among several groups, including racial/ethnic minorities (Borell et al., 2007; Gee et al., 2007; Yoo et al., 2009) and lesbian, gay, bisexual (LGB) individuals (McCabe et al., 2010; McKirnan and Peterson, 1988).

These studies have provided important information, but the development of alcohol use/misuse and associated problems often occurs much earlier in the life course. Consequently, prospective studies that focus on developmental periods of heightened risk, particularly young adults and college students (Grant et al., 2004; Wechsler and Isaac, 1992), are needed. In addition to evaluating factors that confer risk, it is also critical to understand the mechanisms explaining this risk. That is, how is it that discrimination “gets under the skin” and leads to the development of alcohol-related problems? Recent review articles on discrimination and health have pointed to the paucity of research examining the pathways through which discrimination leads to the development of health problems, including alcohol use and misuse (Paradies, 2006; Williams & Mohammed, 2009).

To address these research questions, this paper draws on a recently developed theoretical framework for understanding how discrimination results in adverse mental and behavioral health outcomes among members of socially disadvantaged groups, including women and LGB populations (Hatzenbuehler, 2009; Hatzenbuehler et al., 2010). According to this framework, the stress associated with discrimination renders individuals more vulnerable to established psychological processes that confer risk for negative health outcomes. In turn, these processes mediate the discrimination-health association. In order to test the predictive validity of this mediation framework with respect to alcohol-related problems, it is necessary to identify psychological processes that are (1) established cognitive and affective risk factors for alcohol-related problems and (2) probable sequelae of discrimination.

Existing research provides support for both of these criteria. First, there is a large literature on established cognitive and affective processes that contribute to higher rates of alcohol consumption and associated problems among college students (see Sher et al., 2005), including negative affect (Hussong et al., 2001; Kassel et al., 2000), coping motives (Ham and Hope, 2003; Kuntsche et al., 2005), and alcohol expectancies (Goldsmith et al., 2009; Larimer et al., 2004). Second, discrimination is conceptualized as a specific stressor (e.g., Clark et al., 1999; Meyer, 2003a; Williams et al., 2003), and there is a considerable literature on the relations between general life stressors and these established cognitive and affective processes.

For instance, negative affect has been shown to mediate the stress-alcohol use relationship (Hussong and Chassin, 1994), and discrimination is associated with negative affect, including psychological distress (Diaz et al., 2001) and DSM-defined major depression and anxiety disorders (Kessler et al., 1999; Mays and Cochran, 2001). Importantly, one prospective study of African American adults demonstrated that the association between discrimination and substance use (including alcohol, tobacco, and other substances) was mediated by symptoms of depression and anxiety (Gibbons et al., 2004). Another affective risk factor for alcohol use and problem use is coping motives, which refer to the “strategic use of alcohol to escape, avoid, or otherwise regulate negative emotions” (Cooper et al., 1995, p. 991). Stress is associated with stronger coping motives, which in turn account for the relationship between stress and increased alcohol consumption among college students

(Ham and Hope, 2003; Park et al., 2004). Coping motives have been hypothesized to be a mechanism through which stress related to having a stigmatized identity leads to alcohol use (Bux, 1996), but no studies have empirically examined this pathway.

In addition to affective risk factors, cognitive processes such as alcohol expectancies may also serve as explanations for higher rates of drinking among those exposed to discrimination. According to alcohol expectancy theory (Goldman, Brown, & Christiansen, 1987), the combination of strong positive outcome expectancies (expectations of positive and negative reinforcement from drinking alcohol such as increased sociability and decreased tension) together with low negative expectancies (e.g., that alcohol will lead to cognitive or behavioral impairment) will lead to increased consumption and problems. Results from two recent studies are consistent with the hypothesis that discrimination may lead to the development of alcohol expectancies that in turn place people at risk for alcohol use and misuse. Hatzenbuehler et al. (2008) found that positive alcohol expectancies mediated the prospective relation between LGB status and alcohol use among LGB young adults. A cross-sectional study of Latino youth showed that perceived discrimination was associated with more positive substance use expectancies (Kulis et al., 2009), but this study did not evaluate whether positive expectancies mediated the association between discrimination and substance use.

Together, multiple lines of research suggest that individual differences in negative affect, drinking motives, and alcohol expectancies may result from experiences of discrimination (Hatzenbuehler, 2009), but no study has tested this combination of risk factors as mediators of the effects of discrimination on alcohol-related problems during a developmental period of risk. The present study used prospective data from a large, diverse sample of college students (N=1,539) to evaluate this hypothesis. The study had four primary aims. First, we sought to establish whether discrimination was a predictor of alcohol-related problems. Second, we examined whether discrimination was associated with established cognitive and affective risk factors for alcohol problems. In particular, drawing on prior research on coping motives (Cooper et al., 1995), it was hypothesized that discrimination would lead to greater positive alcohol expectancies and negative affect, which in turn would predict more coping motives for drinking. Third, we determined whether these cognitive (alcohol expectancies) and affective (negative affect and coping motives) processes predicted greater alcohol-related problems, thereby mediating the prospective association between discrimination and alcohol-related problems. Because women (Kawachi et al., 1999), LGBs (Meyer, 2003a), and racial/ethnic minorities (Williams et al., 2003) have consistently been identified as confronting status-based discrimination, we used multi-group analyses to evaluate the generalizability of the mediating pathways across these different groups.

2. Method

2.1. Sample

The data were from a study on alcohol and other behavioral risks from high school through college. Participants were recruited from the incoming freshman class at The University of Texas at Austin (UT). The study was conducted in compliance with the UT Institutional Review Board.

Eligibility for this 5-year longitudinal project was limited to unmarried first-year students between the ages of 17–19 who had not previously attended college or university. Of the 6,391 eligible students, 88.60% (n = 5,662) were provided information about the study while attending one of six summer orientation sessions. Over 83% of these students agreed to participate and completed a contact form providing basic demographic information. The 729 eligible students who did not attend orientation were invited by mail and 18.1% returned a

contact form. Thus, a total of 4,832 (75.60%) students with complete contact information were initially enrolled in the study and were randomly assigned to one of three study conditions. The first condition involved semi-annual assessments beginning at the end of high school and ending in the fall of the fifth year (N=3,046). The other two conditions included a Wave 1 and Wave 8 (fall) only assessment group (i.e., High School and Year 4 assessment) and a Wave 8 assessment group (i.e., Year 4) in order to assess the impact of repeated measures on the outcomes. The current study focuses on the semi-annual assessment sample only, as they are the only sample that completed both waves of data (waves 8 and 9) used in the analyses. A total of 2,245 participants (73.7% of those randomly assigned to this sample), completed the wave 1 survey. Attrition analyses from wave 1 to waves 8 and 9 are presented in the results section.

Data for the current study were from the final two waves of data (N=1,539), because the measures of discrimination experiences and drinking motives were not included in earlier waves of data collection.

The majority of the 1,539 participants (64% female; mean age = 21.77) were White (53.70%), with 19.70% Asian-American, 14.50% Hispanic/Latino, 4.20% African American, 5.90% mixed ethnicity (racial/ethnic categories were not mutually exclusive), 0.70% Native American/Pacific Islander, and 1.20% choosing not to answer. Approximately 4% (N = 59) of the sample self-identified as gay, lesbian, or bisexual.

Students accessed a secure website (DatStat Inc.; Seattle, WA), where they provided informed consent and completed the surveys.

2.2. Predictor Variable

Discrimination—The Everyday Discrimination Measure (Williams et al., 1997) is a 9-item measure that was used to assess the frequency of perceived discrimination, ranging from never (1) to often (4). Sample items include “You are treated with less respect than other people” and “You are threatened or harassed.” The items are presented in general terms, without reference to prejudice or discrimination. Participants are then asked to indicate each of the reasons for the mistreatment on a checklist that included the following: gender, body weight, other physical appearance, style of dress, sexual orientation, race/ethnicity, religion, language, who you hang out with, and “other.”

This measure has been used in numerous studies to examine the relationship between discrimination and adverse health outcomes among multiple groups, including African Americans (Matthews et al., 2005), Asian Americans (Chae et al., 2008), LGB individuals (Mays and Cochran, 2001), and the overweight/obese (Puhl et al., 2008). Convergent and divergent validity has been documented; the scale was found to be significantly associated with perceived stress, but not with measures of hostility or social desirability (Taylor et al., 2004).

Prior work has indicated that perceptions of discrimination are harmful for mental health, regardless of the source of discrimination (Kessler et al., 1999). Consequently, we summed the 9 items for all participants, irrespective of the perceived reasons for the mistreatment. The scale demonstrated excellent internal reliability in the current sample ($\alpha = .91$).

2.3. Outcome Variables

Alcohol problems—Problem drinking was assessed with the Rutgers Alcohol Problem Index (RAPI; White and Labouvie, 1989), a reliable and valid measure of alcohol problems in adolescents and college students (Neal et al., 2006). The measure includes 23 items assessing the frequency with which a variety of events or experiences happened as a result

of drinking in the prior 3 months, such as “neglected your responsibilities,” “missed out on other things because you spent too much money on alcohol,” and “had withdrawal symptoms (i.e., felt sick because you stopped or cut down on drinking).” Items were scored on a scale from 1 (0 times) to 5 (more than 10 times). This scale demonstrated excellent internal reliability ($\alpha = .91$).

Binge drinking—We assessed frequency of binge drinking with the following item: “During the past 3 months, how many times did you have four/five (for women/men) or more drinks at a sitting?” (Wechsler and Isaac, 1992).

2.4. Mediator Variables

Coping motives—The 5-item drinking to cope subscale from the Coping and Enhancement Motives Scale (Cooper, 1994), the most commonly used measure of drinking motives (Kuntsche et al., 2005), was used. Participants reported the relative frequency of drinking to manage or cope with negative emotions (e.g., “to forget your worries”) across all drinking episodes on a five-point scale ranging from 1 (almost never/never) to 5 (almost always/always). The scale demonstrated excellent internal reliability ($\alpha = .91$).

Negative affect—The Positive and Negative Affect Scale (PANAS; Watson et al., 1988) was used to assess negative affect. Participants were asked to rate “the extent to which you have felt this way” during the past three months, with responses ranging from never (1) to always (5). The five negative affect words used in the analyses (upset, hostile, ashamed, nervous, and afraid) demonstrated adequate internal reliability ($\alpha = .79$).

Positive alcohol expectancies—Our hypothesized cognitive mediator was positive alcohol expectancies, which were measured through the Brief Comprehensive Effects of Alcohol questionnaire (B-CEOA; Ham, Stewart, Norton, & Hope, 2005). The B-CEOA includes items from each of the four positive (tension reduction, sociability, enhanced sexuality, and liquid courage) expectancy scales on the original CEOA (Fromme, Stroot, & Kaplan, 1993). These four positive subscales were used as indicator variables for a latent positive alcohol expectancies variable. Cronbach’s alpha for the positive expectancy scale was 0.82.

2.5. Statistical Analyses

Structural equation modeling (SEM) was used to test the mediation hypotheses. These analyses were conducted using full information maximum likelihood estimation in MPLUS 5.0, which estimates means and intercepts based on all of the available data. Across the two waves of data used, an average of 12.40% of study variables was missing. Due to the non-normal (positively skewed) distributions of the binge drinking and alcohol-related problems variables, bootstrapping (2000 samples) was used to generate bias-corrected standard errors and confidence intervals. The structural model examined discrimination and the cognitive (alcohol expectancies) and affective (negative affect and coping motives) mediators as longitudinal predictors of alcohol-related problems at wave 9, controlling for wave 8 alcohol-related problems and concurrent (wave 9) levels of binge drinking. Two nested models were compared to evaluate the mediation hypothesis, with a significant difference between the model excluding the mediation paths and one including the mediation paths supporting mediation. Indirect effects of discrimination on alcohol-related problems through the hypothesized mediators were also examined to identify specific mediational paths. Finally, multi-group analyses were conducted to examine whether the mediation model was moderated by group characteristics associated with discrimination, including gender, sexual orientation, and race/ethnicity.

3. Results

3.1 Attrition Analyses

A total of 2,245 participants assigned to the longitudinal sample completed the first questionnaire. The average attrition between waves was 5.4%. Of participants who completed the initial survey, 68.60% ($n=1,539$) completed the wave 8 survey, and 63.70% ($n = 1,429$) completed the wave 9 survey. Those who remained in the study by wave 9 were more likely to be female and Asian-American and more likely to be lighter drinkers. However, those who dropped out between waves 8 and 9 (the waves used in the analyses) were quite similar to those who completed both surveys. Of the 6 study variables, only negative affect differed, with those completing both waves 8 and 9 having slightly higher levels of negative affect ($M=10.76$) compared to those who did not complete both waves ($M=10.29$).

3.2. Descriptive Statistics and Preliminary Analyses

Discrimination experiences were common, with over forty percent of the sample ($N = 646$; 42%) experiencing at least one discrimination event “some of the time.” Among those reporting discrimination at least some of the time, discrimination due to gender was the most commonly reported (34.40%), followed by race/ethnicity (29.10%); 4.40% of the sample reported discrimination due to sexual orientation at least some of the time. The mean discrimination scores for our three groups of interest were: women ($M=1.58$, $SE=0.55$), LGB ($M=1.84$, $SE=0.64$), and racial/ethnic minorities ($M=1.67$, $SE=0.60$).

Prior to testing the structural models, we examined the correlations among the study variables (see Table 1). Consistent with study hypotheses, discrimination was positively correlated with each of the proposed mediators as well as the outcome of alcohol-related problems. Thus, the proposed model for negative consequences of drinking was appropriate for testing through structural equation modeling.

The measurement model (confirmatory factor analysis for alcohol expectancies) was constructed using four indicator variables: the tension reduction, sociability, enhanced sexuality, and liquid courage subscales of the B-CEO scale. The factor loadings of each of the four indicator variables were high ($\beta > .63$), but the measurement model showed inadequate fit to the data ($\chi^2 (2) = 73.79$, $p < .01$; CFI = .97; RMSEA = .16). Modification indices suggested that allowing the error terms for tension reduction and sex expectancies to covary would improve model fit. Freeing this parameter resulted in good model fit ($\chi^2 (1) = 7.67$, $p < .01$; CFI = 1.00; RMSEA = .07).

3.3. Mediation Analyses

Figure 1 depicts all pathways in the full mediational model. To examine mediation, we tested two nested models. In the unmediated model, the cross-sectional paths from discrimination to the mediators (3 paths), and the prospective paths from the mediators to alcohol-related problems (3 paths), were set to 0. In the mediated model these six paths were freely estimated. Although the paths from discrimination to the proposed mediators were cross-sectional, directional paths were included based on theory and prior research. Because these models are nested, a chi-square difference test with six degrees of freedom determines whether the mediated model provides a statistically significant improvement in model fit over the unmediated model.

As anticipated, the unmediated model provided poor fit to the data, ($\chi^2 (28) = 392.87$, $p < .01$; CFI = .90; RMSEA = .09) given the absence of the critical mediational paths. In contrast, the mediational model provided excellent fit to the data ($\chi^2 (22) = 73.46$, $p < .01$;

CFI = .99; RMSEA = .04). Figure 2 provides standardized coefficients for the direct effect of discrimination on alcohol-related problems and for all of the proposed mediational pathways. Perceived discrimination at wave 8 was significantly associated cross-sectionally with greater negative affect ($\beta = .40, p < .01$) and coping motives ($\beta = .14, p < .01$), but not with positive alcohol expectancies ($\beta = .03, p = .30$). Both alcohol expectancies ($\beta = .23, p < .01$) and negative affect ($\beta = .14, p < .01$) were associated cross-sectionally with stronger coping motives for drinking. Stronger coping motives were prospectively associated with more alcohol-related problems ($\beta = .12, p < .01$), controlling for concurrent binge drinking and problems at wave 8. These standardized coefficients correspond to Cohen's (1988) medium (.24) and large (.37) effect sizes. In contrast, neither negative affect ($\beta = .06, p = .09$) nor alcohol expectancies ($\beta = .02, p = .24$) were directly associated with alcohol-related problems prospectively. The direct pathway from discrimination to alcohol-related problems ($\beta = .01, p = .84$) was not significant.

The chi-square difference test was highly significant ($\Delta\chi^2(6) = 319.41, p < .01$), providing evidence for mediation of the association between discrimination and alcohol-related problems. Providing further support for mediation, the total indirect effect from discrimination to alcohol-related problems was statistically significant (unstandardized coefficient = .35 (SE = .12), $p < .01$). To clarify the specific paths that accounted for the total indirect effect, we examined the specific indirect effects through the proposed mediators. The indirect effect from discrimination to alcohol-related problems through coping motives (unstandardized coefficient = .12 (SE = .05), $p < .01$), and the indirect effect from discrimination to alcohol-related problems through negative affect to coping motives (unstandardized coefficient = .05 (SE = .02), $p < .01$) were both statistically significant. No other indirect effects were statistically significant (all p values $> .10$).

3.4. Multi-group Analyses of Moderated Mediation

Multi-group analyses were conducted to examine whether the process of mediation was moderated by group characteristics associated with discrimination experiences, including gender, sexual orientation, and race/ethnicity. Factor loadings and intercepts for the expectancy composite were initially constrained to equality to establish measurement invariance. After establishing a common measurement model, the structural paths were constrained to see if the paths among the variables in the model operated similarly across groups. The measurement model for men and women failed to demonstrate invariance ($\Delta\chi^2(6) = 31.65, p < .01$) but freeing the parameter for the intercept of tension reduction expectancies resulted in a partially invariant measurement model ($\Delta\chi^2(5) = 9.47, p > .05$). Additional constraints on the structural paths did not lead to a decrement in model fit ($\Delta\chi^2(16) = 18.54, p > .10$), suggesting that the paths among the variables in the model operated similarly for men and women. When the measurement paths were constrained to equivalence across racial/ethnic groups, there was a significant decrement in model fit ($\Delta\chi^2(6) = 37.91, p < .01$), but freeing the intercepts for social and liquid courage expectancies resulted in a partially invariant measurement model ($\Delta\chi^2(4) = 9.73, p = .05$). Additional constraints on the structural paths did not lead to a significant change in model fit ($\Delta\chi^2(16) = 23.96, p > .05$), suggesting that the process of mediation was similar for Whites and non-White participants. The measurement model demonstrated invariance by sexual orientation ($\Delta\chi^2(67) = 1220.19, p = .05$), but adding constraints on the structural paths led to a decrement in model fit ($\Delta\chi^2(16) = 61.804, p < .01$). Due to the large standard errors associated with the small sample of LGB students ($n=68$), it was not possible to meaningfully interpret the individual parameters that differed by group, though the standardized regression coefficients for the four parameters that differed by sexual orientation were all stronger within the LGB sample.

4. Discussion

Prior cross-sectional research with adults has shown that perceived discrimination is associated with alcohol use (Borell et al., 2007; Yoo et al., 2009), as well as alcohol-related problems (Gee et al., 2007; McCabe et al., 2010; McKirnan and Peterson, 1988). Consistent with prior research indicating that stress is more predictive of alcohol problems than alcohol use (McCreary & Sadava, 1998; 2000), we found that discrimination was associated with alcohol-related problems, controlling for levels of consumption. To our knowledge, this is the first study to document that perceived discrimination is prospectively associated with alcohol-related problems among a sample of college students, who are at heightened risk for the development of substance abuse (Grant et al., 2004; Wechsler and Isaac, 1992). Given the substantial social and psychological difficulties associated with problem use among college students (Ham and Hope, 2003), the results of the present study suggest that discrimination may represent a particularly important risk factor during this developmental period.

Despite repeated calls for research on mechanisms of the relation between discrimination and adverse health outcomes (Gilman et al., 2001; Meyer, 2003a; Paradies, 2006; Williams et al., 2003), few empirical studies have evaluated potential mediators. Results of the current study provide novel information regarding factors that account for the association between discrimination and alcohol-related problems. In particular, discrimination was associated with greater negative affect, consistent with prior research (Diaz, et al., 2001; Kessler et al., 1999; Mays and Cochran, 2001). Coping motives accounted for significant variability in the prospective association between perceived discrimination and alcohol-related problems, providing support for a stress-mediation model. Additionally, results indicated significant indirect effects from discrimination to alcohol-related problems through the pathway linking negative affect to coping motives. It is important to note that coping motives are but one potential affective mechanism linking discrimination to alcohol problems. Individuals with stigmatized identities adopt myriad strategies for coping with status-based discrimination, including rumination (Hatzenbuehler, 2009), suppression (Hatzenbuehler, Nolen-Hoeksema, & Dovidio, 2009), and reappraisal (Miller & Kaiser, 2001). These strategies should be examined in future research on pathways that explain how discrimination ultimately leads to the development of alcohol problems.

It was hypothesized that alcohol expectancies would be an additional mechanism linking discrimination to alcohol-related problems. This hypothesis was based on prior cross-sectional research documenting associations between perceived discrimination and positive substance use expectancies (Kulis et al., 2009), as well as one prospective study showing elevated alcohol expectancies among a group facing chronic discrimination (i.e., LGB individuals; Hatzenbuehler et al., 2008), suggesting that the stress associated with discrimination may lead to the development of positive expectancies for alcohol. However, results of the present study did not find support for mediation through alcohol expectancies. Thus, results of the present study suggest that affective mechanisms, particularly coping motives, may be more important to the development of alcohol-related problems subsequent to experiencing discrimination, relative to alcohol expectancies. Future studies are needed to determine whether these results hold for other established cognitive risk factors for alcohol-related problems.

One of the strengths of the current study was the large, diverse sample, which afforded the opportunity to examine whether the proposed mediational processes differed based on group characteristics associated with discrimination experiences. Multi-group analyses indicated that the processes mediating the discrimination-alcohol problems association did not differ by race/ethnicity or gender. Although the sample size for LGB students was too small to

allow interpretation of group differences in the individual parameter estimates, the model appeared to operate similarly for LGB students, with some evidence that certain paths were stronger for this group than for heterosexual students. It is important to note, however, that the unique aspects of the stigmas that we examined (e.g., concealed versus conspicuous) may be associated with different pathways to drinking and associated problems among these groups that were not examined in the current study. Thus, although our results suggest generalizability across groups that confront status-based discrimination, these findings warrant replication and more explicit examination in future studies.

Future research is also needed to consider the cross-cultural implications of our results. Indeed, women, LGBs, and racial/ethnic minorities confront substantial discrimination worldwide. For example, over 80 countries currently ban homosexuality (Joint United Nations Programme on HIV/AIDS, 2008), and LGB individuals face the death penalty in at least seven of these countries (International Lesbian and Gay Association, 2007). Moreover, a recent report released by the Office of the High Commissioner for Human Rights concluded that women “continue to experience State sanctioned and condoned discrimination” (Banda, 2008, p. 115) in multiple domains, from obedience laws to succession and inheritance. Given variability in patterns and norms for alcohol use across countries (Hasin, Hatzenbuehler, Keyes-Wild, & Ogburn, 2007), future research should consider the extent to which discrimination remains a predictor of problematic use cross-culturally, and whether similar cognitive and affective mechanisms explain these associations.

The results of the present study have important implications for intervention strategies. First, given that discrimination appears to initiate a cascade of cognitive and affective processes conferring risk for problem drinking, social-structural level interventions are needed to reduce stigma and prejudicial attitudes towards traditionally stigmatized groups. Because efforts to improve attitudes towards stigmatized groups involve protracted changes over time (Hinshaw and Stier, 2008; Link and Phelan, 2001), individual-level interventions are also needed to address the mental health needs of those suffering from discrimination-related health problems.

Although no evidence-based treatments currently exist that specifically address these needs (e.g., Cochran, 2001), recent research on coping with stigma (Miller and Kaiser, 2001; Puhl and Brownell, 2006) may provide important insights that can facilitate the development of such interventions. In addition, this study identified potential affective sequelae of discrimination, including coping motives, which are modifiable through existing interventions. The results suggest that augmenting emotion regulation skills may decrease coping motives for drinking, and therefore reduce problematic drinking. This might be accomplished through several existing interventions, including emotion-focused therapies (Greenberg, 2002), mindfulness (Segal et al., 2002), and dialectical behavioral therapy (Linehan, 1993), all of which have shown promise in facilitating more adaptive regulation of emotions.

This study represents an important contribution to the literature on discrimination and alcohol-related problems, but limitations should be considered. The study relied on self-report data for alcohol use and problems, without collateral reporters. Nevertheless, several studies have demonstrated that self-reports of alcohol use are reliable and valid and do not underestimate alcohol use relative to collateral reports (Babor et al., 2000; LaForge et al., 2005). The study also used self-report measures of alcohol expectancies. As others have suggested (Goldsmith et al., 2009), this measurement strategy assumes that respondents are aware of their expectancies for drinking. Because such cognitions often occur outside of conscious awareness (Kramer and Goldman, 2003), self-report measures can lead to an

under-reporting of alcohol expectancies, which may have impacted our ability to detect prospective associations between discrimination and alcohol expectancies.

Additional measurement concerns have to do with the subjective reports of discrimination. Although prior studies (Taylor et al., 2004) have documented convergent and divergent validity for the discrimination measure used in this study, there are several potential limitations to self-report measures of discrimination. First, there are many psychological processes that may lead individuals to under- or over-report discrimination experiences (Crocker and Major, 1989; Crosby, 1984), which could lead to biased estimates of the association between discrimination and health-risk behaviors. Second, with subjective measures of discrimination, there is the potential for confounding between an individual's current mood or mental health status and his or her perception of discrimination (Meyer, 2003b). However, at least one prospective study has shown that poor health at baseline did not predict endorsement of discrimination at follow-up assessments, but discrimination predicted subsequent poor health outcomes (Gee and Walsemann, 2009). These results suggest that response tendencies (e.g., negativity) are not likely to have been a confound in the current study. Although the majority of studies on the relation between discrimination and adverse health rely on self-report measures (e.g., Williams et al., 1997), it is important to note that these measures capture perceived experiences of discrimination, rather than actual discrimination, which require different assessment procedures. Future research should therefore adopt additional measures of discrimination that are more objective and less subject to the influence of the perceiver's attributions (e.g., Wethington et al., 1995).

Research on the intersection of multiple stigmatized identities has demonstrated that racial/ethnic sexual minorities face stressors that are multiplicative in nature (e.g., Stirratt et al., 2008). In the present study, we did not have a large enough sample size of certain subgroups of individuals (e.g., African American lesbians) to examine whether having multiple stigmas conferred additional risk for the psychological mediators that were evaluated. This research question remains an important avenue for future inquiry. An additional study limitation concerns selection biases. It is possible that those most impacted by discrimination were not included in our study of college students because of failure to achieve entry into college or to afford tuition. Replication of these results in community samples of young adults is therefore needed to establish generalizability. Finally, it is important to note that we did not test a fully longitudinal model. Although it is unlikely that the proposed mediators could cause discrimination, we cannot completely rule out reverse causality. Future studies with three or more time points are therefore needed to definitively test mediation hypotheses (Maxwell & Cole, 2007).

These limitations notwithstanding, the current study has several strengths that make an important contribution to the literature on discrimination and negative health outcomes. First, the large sample size provided adequate power to detect associations among study variables. Second, the study's diverse sample relative to other longitudinal college samples included substantial numbers of racial/ethnic and sexual minorities, which afforded the opportunity to examine the mediating effects of discrimination on health-risk behaviors among multiple groups confronting chronic discrimination. Finally, this is the first study to our knowledge to evaluate specific mechanisms prospectively linking discrimination to alcohol-related problems. These results provide novel information regarding the ways in which discrimination might ultimately contribute to deleterious health-risk behaviors. In so doing, the study suggests a theoretical framework for future research on this important topic, and identifies several targets for prevention and intervention efforts with individuals experiencing discrimination.

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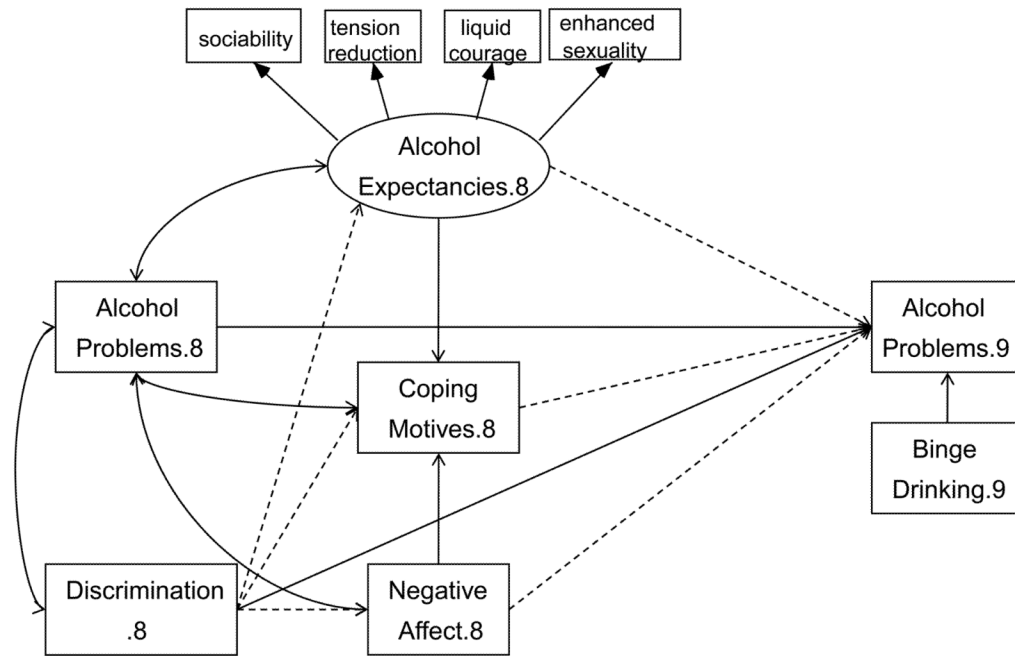


Figure 1. Hypothesized Mediation Model

Notes: This model depicts all pathways that were tested in the full mediation model. Dotted lines indicate paths that were central to the mediation hypotheses and that differed between the two nested models that were tested. Variables followed by .8 were assessed at Wave 8; Variables followed by .9 were assessed at Wave 9.

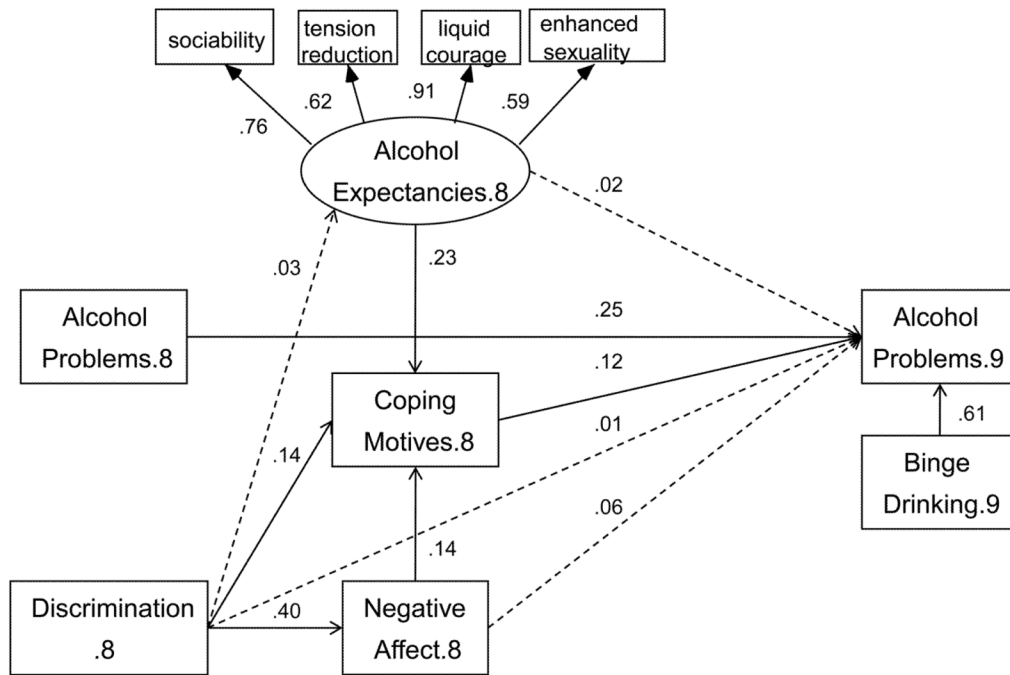


Figure 2. Longitudinal Model with Path Coefficients for Mediated Pathways

Notes: For ease of interpretation, this figure depicts only the path coefficients for the hypothesized mediation pathways. Non-significant pathways are presented with dotted lines. Variables followed by .8 were assessed at Wave 8; Variables followed by .9 were assessed at Wave 9.

Table 1

Descriptive Statistics and Correlations among Study Variables

	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11
1. Discrimination W8	1.62 (.55)	—										
2. Coping Motives W8	1.49 (.70)	.26**	—									
3. Negative Affect W8	2.17 (3.30)	.42**	.32**	—								
4. Tension Reduction W8	1.99 (1.12)	.08**	.24**	.09**	—							
5. Liquid Courage W8	3.39 (1.19)	.07**	.32**	.19**	.56**	—						
6. Enhanced Sexuality W8	2.73 (1.21)	.04	.24**	.10**	.52**	.55**	—					
7. Sociability W8	3.82 (1.14)	.03	.26**	.15**	.49**	.70**	.43**	—				
8. Frequency of binge drinking W8	4.13 (7.26)	-.04	.20**	.01	.08**	.19**	.16**	.17**	—			
9. Alcohol problems W8	2.60 (5.44)	.15**	.43**	.02	.11**	.27**	.21**	.22**	.48**	—		
10. Frequency of binge drinking W9	3.53 (6.52)	-.01	.14**	.25**	.08**	.14**	.15**	.17**	.63**	.32**	—	
11. Alcohol problems W9	1.92 (4.46)	.10**	.31**	.17**	.12**	.19**	.16**	.16**	.31**	.43**	.44**	—

Notes. W8 = Wave 8; W9 = Wave 9. For ease of interpretation, the data for binge drinking and alcohol-related problems are presented in their original scales of measurement. In the SEM models, these variables were log-transformed.

** p < .01,

* p < .05.